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Cardiac Asthma.—Cardiac asthmatic attacks usually occur at night. Left ventricular failure due to any one or a combination of several factors, with resultant stasis of blood and pulmonary oedema, appears responsible for the attacks, but the exact mechanism is not clear. In a group of 250 cases discovered among 3,100 patients with organic heart disease, 180 were males, and all but fourteen were over 40 years of age. The grave prognostic significance of the condition is shown by the fact that 170 of the 250 patients died, with an average duration of life of 1.4 years after the first attack of asthma. The largest number of cases, 187, was found in the group with coronary disease, hypertension, or both, but the highest relative incidence occurred in syphilitic heart disease (21 per cent) and in chronic nephritis (19 per cent). The frequency, duration and severity of the attacks altered the prognosis appreciably only when of extreme degree. The coincidence of poor heart-sounds, gallop rhythm and pulsus alternans indicated a very short life. Aortic regurgitation was the only common valvular defect, occurring in 63 cases of the 250. In therapy, digitalis and rest were generally effective in reducing the number of attacks and apparently in prolonging life. In the acute attacks nitrites and alcohol were sometimes helpful, but morphine was of the greatest value.—*The Clinical Significance of Cardiac Asthma: Review of Two Hundred and Fifty Cases, R. S. Palmer and P. D. White, J. Am. M. Ass., February 9, 1929, xcii, 431.*—(*G. L. L.*)

Asthma and Eczema.—In an effort to determine the relation of eczema to allergy, a study was made of 239 cases of eczema in children and 84 in adults, referred because of the possibility of allergy and the failure of other treatment. The children ranged in age from two weeks to twelve years. In children skin tests with food and dust allergens were positive in 52 per cent, but in the 27 cases complicated by asthma they were positive in 88 per cent. In adults only 38 per cent gave positive skin reactions, although the percentage was 70 in the 40 cases (47 per cent of the entire group) complicated by asthma and hay fever. Eczema in children began before the end of the second year in 95 per cent of the cases, and it was slightly more common in boys. In adults the onset varied from infancy to 60 years of age and was much more common in women. In the children, egg, wheat and milk caused positive reactions in all but 12 of the 125 reactors, and improvement occurred in 83 per cent after elimination of these foods. With empirical removal of these foods in 92 test-negative patients, the eczema was improved in 38 per cent. Among the test-positive adults, foods caused a positive reaction in only three. A positive family history of allergy was found in 28 per cent of the children and in 37 per cent of the adults. Among the children a "cure" of eczema has occurred in 36 per cent, but in the adult group, of 65 patients followed, the percentage is only 18, which compares, however, with 20 per cent of "cures" in

asthma. In eczema, as in asthma, the data suggest that the former can disappear spontaneously when the hygienic background is good and ordinary irritating causes are eliminated.—*Studies in Asthma: VI Eczema: Its Relation to Allergy, E. S. O'Keefe and F. M. Rackemann, J. Am. M. Ass., March 16, 1929, xcii, 883.*—(*G. L. L.*)

Prognosis in Hay Fever.—In a total of 410 patients with ragweed hay fever, relief of symptoms, which appears to be complete and permanent and without further treatment, has occurred in 26 patients, or 6.3 per cent. The relief has persisted for an average duration of 4.6 years. This relief ("cure") does not depend upon the total number of years of treatment, nor does it apparently depend upon a particular technique of treatment. "Cures" among patients with early hay fever occur in 7 per cent, a comparable figure. Inasmuch as skin tests may be positive in the presence of long-standing and complete relief, "cure" must be, in most cases, a clinical rather than an immunological phenomenon.—*The Ultimate Prognosis in Hay Fever, F. M. Rackemann, Am. J. M. Sc., March, 1929, clxxvii, 333.*—(*W. I. W.*)

Chest Injuries.—Trivial injuries to the thoracic wall may give rise to rupture of the lung and spontaneous pneumothorax. Radiology plays a very important rôle in the detection of such conditions. Fracture of the ribs may result in a haematoma from rupture of an intercostal artery. This cannot be detected in the roentgenograph unless large enough to cause bulging inward of the pleura or considerable swelling of the subcutaneous tissues. Very rarely it fails to resolve, and results in calcified plaques in the chest wall. Traumatic pleurisy may occur without associated injury. Pleural effusion rarely results. Many cases have been encountered in which haemothorax was not detected in the roentgenograph made soon after the injury, but only at reëxamination several days later, probably due to the fact that oozing from the lung may continue for a long time. The radiographic picture of recent haemorrhagic effusions may vary somewhat from those of the ordinary type. The blood spreads itself out in a thin layer between lung and parietal pleura, causing a diffuse haziness from apex to base. The shadow is less dense than that seen in ordinary pleural effusions, and the ribs can be distinguished through the involved area. The costophrenic angle is not obliterated, and there is a similar uniform density over the entire apex. Radiographically, haemorrhage into the lung shows an area of definite haziness, with large irregular blotchy areas of increased density,—but no clearly defined areas of infiltration or consolidation. A traumatic pneumonia may develop any time from one to ten days after injury, and usually takes on the form of lobar pneumonia.—*Injuries to the Chest: A Radiologic Study, L. R. Sante, J. Am. M. Ass., November 24, 1928, xci, 1603.*—(*G. L. L.*)

Septic Bronchopulmonary Infections.—These comprise a group of conditions that are common and varied in their clinical manifestations and therapeutic demands, and are found at all ages and in all walks of life. Chronic cough and purulent sputum are the most frequent symptoms, to which more importance should be attached in their earlier stages, but they are so common as to be regarded as necessary afflictions until bronchiectasis has become established or bronchopneumonia has developed. Among the candidates for these infections are the child who aspirates a foreign body, the boy of 15 who has coughed and spat since an attack of whooping-cough, and the patient with purulent nasal discharge, infected tonsils or sinus disease. The relationship between upper and lower respiratory tracts in many of these infections has been clearly demonstrated, and the pulmonary bases have been called "cesspools" for upper respiratory infections. A suppurative condition in the upper respiratory tract may cause infection and weakening of the bronchial wall: desquamation of ciliated epithelium, bronchial dilatation and stagnation of secretions result; then growth of putrefactive bacteria and further weakening of the bronchial wall and extension of infection; and eventually there is extension to the pulmonary parenchyma, bronchopneumonia, and its legacy of fibrosis and pulmonary damage. Extension to the pleura may occur, with pleuritis or empyema. The history is most important. Septic emboli or infarcts, following abdominal operations or secondary to ulcerative endocarditis or phlebitis or perinephric abscess, are all important aetiological factors. Foreign bodies, malignant disease, enlarged lymph nodes at the root of the lung, aneurysms and mediastinal conditions, act mechanically to cause bronchial obstruction and secondary septic infections. Churchill and Holmes have emphasized the relation between atelectasis and suppuration. Fibrosis following pneumonia and constricting small bronchi may result in the gradual onset of septic infection. It is important that early infections of the upper respiratory tract be not allowed to go unheeded. There is a definite train of events between sinus infection and bronchial infection. Most important in diagnosis is a

careful and painstaking history. Also, more attention should be paid to the amount and character of the sputum and to search for small bits of tissue, concretions, casts, elastic fibres and such microörganisms as spirochaetes or fusiform bacilli. Serial X-rays or X-ray films taken in different positions may be of considerable value. Bronchoscopic examination should be done when there is a possibility of foreign body or malignant tumor or bronchial stenosis. The use of lipiodol is valuable in certain cases, especially when the lesion is concealed by the heart shadow. The heart is often displaced to the side of the lesion and the diaphragm is elevated. The roentgenographic appearance is that of a triangular shadow with apex toward the hilum and hypothenuse running along the diaphragm. When a definite diagnosis cannot be made the generic term of "septic bronchopulmonary infection" or "chronic bronchopulmonary suppuration" is employed. A better classification is needed, and the form of treatment must depend on the severity of the disease. The importance of rest in all these cases needs emphasis, especially following bronchopneumonia and acute upper respiratory infections. In bronchiectasis the symptoms often go back many years and in some respects suggest tuberculosis. It is surprising that chronic cough and purulent sputum should be so widely regarded as trivial symptoms or a necessary result of climate. Removal of septic foci in the sinuses, antra, tonsils and teeth is equally important. A clean mouth should precede tonsillectomy. Postural drainage is another valuable method of treatment if it is intelligently carried out. When there is much sputum it is inadvisable to check cough by medication. Bronchoscopic drainage is of benefit, especially when there has been bronchial stenosis and in the case of lung abscess near the hilum. In these good results have also been reported by pneumothorax. Neither is of much value in bronchiectasis; when this is severe and limited to one lobe, lobectomy or thoracoplasty should be considered, and in some cases phrenicotomy, which by raising the diaphragm and changing the position of the bronchi, may facilitate drainage.—*Septic Bronchopulmonary Infections, R. Clifford, New England J. M., April 4, 1929, cc, 694.* —*(A. P.)*

Treatment of Unilobar Chronic Bronchopulmonary Suppuration.—Two and one-half years ago a thoracic service or clinic was established at the Massachusetts General Hospital with two surgeons, two medical men and a bronchoscopist in charge. A type of case of particular practical interest is that with a chronic suppurative lesion, nontuberculous, limited to one lobe and commonly designated as bronchiectasis; a more precise term is "chronic bronchopulmonary infection with bronchial dilatation." All methods of treatment other than surgical extirpation are merely palliative and noncurative. Medical treatment in a warm dry climate, with postural drainage, prolongs life and increases comfort, while regularly repeated bronchoscopy with aspiration of pus, and possibly dilatation of strictures and removal of granulation tissue, certainly relieves septic symptoms and reduces the amount of sputum. Injection of medicated oils, and irrigations of the bronchial tree are not considered of therapeutic value. For diagnostic purposes, although much has been written about lipiodol and certainly some very imposing X-ray films can be obtained, it is in most cases unnecessary and it is not at all certain that it may not add to the dangers of carrying infection into the sound lung, where it is often scattered by coughing. Artificial pneumothorax, again, may bring about well-marked temporary improvement but is rarely curative. Infected pleural exudates are a not uncommon complication, and sometimes virulent empyemata develop from rupture of the infected lung area into the pleura. Drainage of large bronchial dilatations is quite justifiable for temporary relief but not curative. Graded thoracoplasty is also merely palliative and rarely advisable when only one lobe is involved. Ideal cases for lobectomy are those limited to a lower lobe, which is shrunken and atelectatic and often overlapped by an over inflated upper lobe. It shows on X-ray as a small triangular shadow based on the diaphragm. Intrapleural amputation of a lobe carries a high mortality and has been abandoned at the Massachusetts General Hospital. The method devised and previously described by Whittemore involves three distinct principles: (1) shutting off the local blood supply, (2) fixing the mediastinum, and (3) allowing for a gradual infection. Infection of the pleural cavity is bound to follow lobectomy for septic conditions. If it takes place rapidly it gets beyond control, spreads, and causes death; if, however, the lobe can gradually become gangrenous and slough off, its blood-supply being occluded, the infection will be slow and the patient can withstand it. *Technique and Results:* Under gas-oxygen and ethylene anaesthesia the pleura is opened, and the diseased lobe examined to determine the extent of the lesion and adhesions, which ought to be firm. If lobectomy is decided on, sufficient rib sections are removed so that the diseased

part may be delivered after the severance of adhesions and pulmonary ligament. The lung, by deep sutures, is fastened to the muscles of the chest-wall with chromic catgut and heavy linen thread. A large gauze sponge is placed beneath it and a no. 20 French catheter placed near its root, shut off, and the wound closed tightly. The portion of protruding lung will usually be about the size of an orange. In about ten days necrosis is complete and a foul discharge sets in, lasting three to five weeks, after which the whole area sloughs off, leaving a clean granulating stump showing a bronchial fistula. The cough meanwhile gradually diminishes, to finally cease in successful cases. The wound is lightly packed daily until it closes. Patients rarely remain over six to eight weeks in the hospital. Of 9 cases operated on, 2 died (of sepsis and pneumonia), 6 have recovered completely and are well, and 1 has a persistent fistula and disease in the good lung. Graham of St. Louis has also had satisfactory results in several patients thus treated.—*The Treatment of Chronic Broncho-Pulmonary Suppurative Lesions Limited to One Lobe of the Lung, W. Whittemore, New England J. M., December 13, 1928, cxcix, 1213.*—(*A. P.*)

Bronchoscopy in Acute Lung Abscess.—The bronchoscope is directly responsible for rekindled interest in lower respiratory infections. Direct visibility upon the pathological process, the securing of uncontaminated cultures, bronchial aspiration, and topical medication of the bronchial mucosa have already been fully elaborated on. The first consideration in lung abscess, whether central or peripheral, if without pleural involvement, should be bronchoscopy, and the secret of success is early diagnosis and treatment. Nothing is more dramatic or fascinating to observe than the abrupt change in the picture of acute lung abscess following bronchoscopy. Profound toxaemic symptoms, as well as incessant cough, gastric disturbance and indescribably offensive breath, subside so quickly as to warrant the conclusion that here is truly a life-saving procedure. Removal of purulent secretions alone can scarcely account for this, since the coughing up of an equal quantity has but little effect. Dilatation and more adequate drainage of the dependent bronchus or bronchi are doubtless more important factors. Injection of lipiodol has been disappointing in localizing and delineating these abscesses, in none of Johnson's cases adding materially to information otherwise obtainable. Johnson uses no general anesthesia for bronchoscopy, but moderate narcosis with morphine and scopolamine, followed by cocainization of the superior laryngeal nerves in the pyriform sinus. Four case reports are included. While the possibility of spontaneous recovery cannot be denied, the fact that all four are well after bronchoscopy is so unusual as to warrant a connection with the procedure.—*Bronchoscopy in Acute Lung Abscess, L. F. Johnson, New England J. M., January 10, 1929, cc, 64.*—(*A. P.*)

Sputum in Chronic Lung Infections.—Direct microscopic examinations and studies of cultures were made of 2,373 sputa from 304 patients. Of these 304 patients, 62 had neither tubercle nor fungus infections; 242, or 6.61 per cent, were infected with the tubercle bacillus only; 27.27 per cent with tubercle bacilli and blastomycetes; and 66.11 per cent with blastomycetes only. —*Differential Diagnosis of Sputum in Chronic Lung Infections, P. J. Marett, Brit. M. J., May 4, 1929, no.3505, 808.*—(*W. I. W.*)

Bacteria of Lung Abscess and Bronchiectasis.—In this study the microörganisms found in the sputum, pus, and pathological tissues from patients suffering with lung abscess and bronchiectasis are recorded and described. All fresh specimens were stained by the Gram and Fontana methods. Cultures were then made aerobically and anaerobically on 5 per cent rabbit-blood-agar plates. Gram stains were made from the various colonies and the morphological characteristics recorded. To complete the identification of the various stains media containing different sugars were inoculated and other media were used when the occasion demanded. Anaerobes were recultured aerobically to differentiate the facultative aerobes from the true anaeroboic microbes. All material was stained to determine the presence of tubercle bacilli. Tuberculous cases were excluded from this report. The bacteriology of lung abscess and bronchiectasis is that of a very mixed group of microorganisms. Morphologically and culturally these microörganisms are similar to those found about normal and diseased teeth and tonsils. In cultures from 16 cases of lung abscess, haemolytic *Staphylococcus aureus* was the pyogenic microörganism most frequently found (80.75 per cent of this series). The percentage of incidence of other microorganisms is as follows: haemolytic streptococcus 68.75 per cent; *Micrococcus catarrhalis* 63.5 per cent; *Bacillus xerosis* 43.75 per cent; pneumococcus 18.25 per cent (type IV most commonly found); and *Mucosus capsulatus*, fusiform bacilli and *Staphylococcus aureus*, each 18.25 per cent. The haemolytic streptococcus, pneumococcus and

Mucosus capsulatus were facultative anaerobes, growing very little or sometimes not at all aerobically on first culture. On further transplanting, these microörganisms would almost invariably grow aerobically. This was especially true of direct cultures from the wound. Cultures from 7 cases of bronchiectatic abscess yielded the following results: haemolytic *Staphylococcus aureus* and *Micrococcus catarrhalis*, each 85.9 per cent; haemolytic Streptococcus 57.2 per cent; *Mucosus capsulatus* 42.9 per cent; and *Streptococcus viridans* 14.3 per cent. In 11 cases of bronchiectasis, *Staphylococcus aureus* was found in 60 per cent of the cases: *Micrococcus catarrhalis* 90 per cent; hemolytic Streptococcus and *Mucosus capsulatus*, 40 per cent each; *Bacillus xerosis* 30 per cent; fusiform bacillus 10 per cent and pneumococcus 40 per cent. In addition to the microörganisms in the foregoing lists the sputum cultures contained many saprophytes such as yeast spore-formers, spirilla etc. These microörganisms were not recorded. When both sputum and wound cultures were obtained they were usually found to contain the same microörganisms. At the time that this work was done the importance of immediate staining for spirochaetes was not realized. Because of this, although spirochaetes were found in some of the cases, this report is limited to the bacterial findings with the exception of one case (no. 11) which is reported in detail. This patient suffered from multiple recurrent lung abscesses, on one of which cautery pneumectomy was done and in the other surgical drainage was established. The usual microorganisms were obtained from both these lesions plus a large variety of spirochaetes as revealed by Fontana's stain. These varied in length from 4 to 25 micra, and the number of spirals from 2 to 18. On dark-field examination motion was variable. Some were jerky and moved rapidly; others had slow snake-like movements. Cultures of these spirochaetes were made in a special medium (fresh diluted horse-serum) anaerobically. Subculturing was tried repeatedly, but was successful only in the first transplant from a young culture. The motility of the spirochaete in the primary cultures lasted only 14 days, and only about 72 hours in the successful subcultures. As the spirochaetes in these cultures were morphologically quite constant it is probable that only one of the apparently many types present survived. It is difficult to classify this spirochaete but it probably should be placed in the *Leptospira* group. After a course of three injections of arsphenamine the number of these spirochaetes so greatly diminished that they could be found only with great difficulty. Some months later, however, they were again abundant; and another series of injections of arsphenamine was followed by no noticeable diminution in their number. The fact that the predominating microörganism in all these cases has been *Staphylococcus aureus* (75 per cent of cases) might be considered to lend some support to the idea that most pulmonary abscesses are embolic in origin rather than due to inhalation and in this respect they are analogous to abscesses of the bones. Too much weight must not be placed on such evidence for it has recently been shown that lung abscess can be produced experimentally by inhalation.—*Microörganisms of Lung Abscess and Bronchiectasis, L. H. Ermatinger, J. Infect. Dis., November, 1928, xliii, 391.*—(*J. S. W.*)

Roentgenology of Pulmonary Gangrene.—Postoperative pulmonary gangrene caused by fuso-spirochaetes has been relatively neglected by roentgenologists. In some instances the plate resembles that of ordinary aspiration abscess except that the former are likely to be less circumscribed. Abscess and excavation form rapidly in fusospirochaetal lesions without gangrene and the inner wall of the abscess is thick and dense with a hazy shadow of peripheral infiltration around it. A fluid level is frequently present. If gangrene be present, the involved areas are much more diffuse and are like pneumonia. They cavitate in several places at one time and these may fuse to form a huge cavity. Sometimes this infection may exist as a complication of bronchiectasis, in which case the previously existing shadow spreads gradually to involve the lower portion of the lung, and may break down to form multiple cavities and may even rupture into the pleural cavity. Cases are cited.—*Fuso-spirochaetal pulmonary gangrene, H. P. Doub, Radiology, October, 1928, xi, 333.*—(*H. S. W.*)

Hyperventilation of Lungs and Pneumonia.—Prior to the present treatment of carbon-monoxide poisoning by inhalation of carbon dioxide and oxygen, pneumonia was a common sequel of asphyxia, but it has been noted that it rarely occurs with the above treatment. In depressed respiration considerable areas of the lungs remain unventilated, the bronchioles may become occluded by accumulating secretions, and atelectasis develops. Following general anaesthesia, postoperative pneumonia occasionally develops in the atelectatic areas because of shallow breathing. Hyperventilation of the lungs by deep breathing under inhalation of carbon dioxide in proper

dilution, usually 5 per cent in oxygen, has proved effective in the prevention of this postoperative pneumonia, undoubtedly because of the distention of these unventilated and collapsed areas, resulting in the cleaning out of the occluding secretions. It is improbable that deep breathing caused by hyperventilation can remove much of the sticky secretions from a fully developed pneumonic area, but it may have some prophylactic value in relation to other areas of the lung, and tend to prevent the spread of the pneumonic condition; therefore it would seem possible that inhalation of carbon dioxide in oxygen might also prove of value in the treatment of pneumonias of other origin.—*Hyperventilation of the Lungs as a Prophylactic Measure for Pneumonia, Y. Henderson and H. W. Haggard, J. Am. M. Ass., February 9, 1929, xcii, 434.*—(*G. L. L.*)

Pneumonia and Pulmonary Tuberculosis.—In children and in adults the late bronchopulmonary sequellae of acute pneumonia, chiefly bronchopneumonia, are often suspected of being, and are not infrequently diagnosed tuberculous. In children attending tuberculosis dispensaries for chest ailments in poor city districts at least, they appear to form a large proportion of the cases, although there seems to be no reason to consider the pulmonary condition due to tuberculosis. It is likely that the present rate of incidence of these nonspecific results of pneumonia in adults is raised temporarily by the influenza pandemic of 1918–1919 with its subsequent waves. In contrast to the childhood cases, the adult patients appear to have become more liable to the development of pulmonary tuberculosis. The occurrence of haemoptysis in such cases, young and old, is not, *per se*, evidence that pulmonary tuberculosis has supervened. The outstanding diagnostic aid is repeated examination of the sputum for tubercle bacilli.—*The Importance of the Late Bronchopulmonary Sequelae of Acute Pneumonia in the Diagnosis of Pulmonary Tuberculosis, W. L. Yell, Tubercle, January, 1929, x,* 157.—(*W. I. W.*)

Aspiration Bronchopneumonia.—The spread of pulmonary tuberculosis to the axillary region of the second lung is more common than is generally realized. Clinical examination of the tuberculous patient should be directed to the axillae, particularly in cases with recent symptoms that have signs of old disease at one apex. The type of spread is a bronchopneumonia resulting from the aspiration of infected sputum, and therefore early pneumothorax is necessary in cavity cases with much sputum. Prognosis in such cases, though grave, is not hopeless, and resolution of the pneumonic process may occur.—*Aspiration Bronchopneumonia of the Secondarily Affected Lung in Adult Phthisis, J. F. Landreth and H. V. Morlock, Tubercle, December, 1928, x, 101.*—(*W. I. W.*)

"Epituberculous" Pneumonia.—Under the name of "epituberculous pneumonia" Kleinschmidt, Eliasberg and Neumann described a disease of childhood. The author contributes to this a case in an adult, in which the picture was that of typical pneumonia. None of the findings indicated tuberculosis, the sputum was free from tubercle bacilli, and the fever rapidly subsided within a few weeks. The roentgen picture subsequently revealed characteristic tuberculous shadows mostly in the hilum region.—*Über die "epituberkulöse" Pneumonie, Toenniessen, Centralbl. f. innere. Med., 1928, xlix, 289.*—(*H. J. C.*)

Early X-Ray Diagnosis of Pleural Disease.—A very common observation in roentgenological plates is a shadow above the right hemidiaphragm which gradually becomes more marked. It is given many different interpretations erroneously because of failure to ascertain a history of earlier abdominal disease, especially if operation has been done for cholecystitis or pyosalpingitis. The condition is a lymphangitis in the pleura behind the dome of the diaphragm. Such shadows have frequently been diagnosed as early carcinoma of the lung. But carcinoma practically always begins at the hilum, as will be evident if lateral plates are made. Very early tuberculosis of the mediastinum often reveals itself, in the properly exposed and developed plate, as a little collection of fuzzy nodes just under the arch of the aorta or in this relative position on the right side. From this nest spring little fan-like shadows which are characteristic of tuberculosis (Dunham). Such appearances in the plate antedate physical signs and appear often in nursing mothers. The roentgenological diagnosis of basal tuberculosis is difficult and can often be made only by exclusion and by consultation with the clinician.—*The Diagnosis of Early Infections in the Pleural Cavity, Especially in the Lungs, W. H. Wallace, Radiology, May, 1928, x, 425.*—(*H. S. W.*).

Empyema.—The surgical treatment of ordinary empyema is often imperative, but no chest should be opened without previous bacteriological examination. It is a great mistake to open the chest in cases of tuberculous empyema unless the latter is compli-

cated by very severe mixed infection. Pneumococci in chains may simulate streptococci when first removed from the chest. Tuberculous empyema should be aspirated and the thoracic cavity washed out. If operation is imperative because of mixed infection, wide resection of ribs is in order, using thoracoplasty (in several stages) or phrenicotomy as soon as possible. As a matter of fact, we have made but little progress in the satisfactory treatment of empyema.—*Die Pleuraempyem, A. Fromme, Deutsche med. Wchnschr., March 30, 1929, lv, 517.—(H. S. W.)*

Treatment of Empyema.—The statistics of empyema reveal that of 1,310 cases in the London Hospital in fifteen years the mortality was 23.9 per cent. Two classes of empyema must be distinguished: those in which the pus lies free in the cavity of the thorax, and those in which it is shut off by adhesions. The principles to be observed in treatment are (1) aspiration of the pus until adhesions have found and sealed off the cavity from the rest of the thorax, and (2) sterilization of the empyema cavity at the earliest opportunity. Closed continuous suction will fulfil these principles more completely than any other method of treatment.—*The Treatment of Empyema, F. G. Thomson, Brit. M. J., January 19, 1929, no. 3550, 89.—(W. I. W.)*

Interlobar Empyema.—The most difficult empyemata to diagnose are those which arise in abnormal situations such as the interlobar fissures. Three brief case reports are recorded. *Physical Signs: In empyema of the upper interlobar fissure.*—Dulness in the second and third interspaces in front, or high up in the axilla, or a band of dulness at the level of the spine of the scapula. Resonance is diminished over the lower lobe from compression and congestion. Over the upper lobe there is diminished bronchial breathing from pressure; over the dull band very weak breath-sounds, sometimes tubular, and, below that, weak and rather bronchial breath-sounds with crepitations. The best place to insert a needle is in the upper axilla, with the arm at right angles to the chest: if the empyema has ruptured into a bronchus the remaining pus is always near the root of the lung, and it may be too deep to be reached from the axilla, and one may have to go in in the interscapular region or in the dull area in front. In the two cases of empyema situated between the middle and lower lobes diagnosed by the author there was no displacement of the heart to the left. The right chest was more or less dull throughout, with distant bronchial breathing with crepitations above the third interspace; in the fourth space from the nipple out to the midaxilla there was louder bronchial breathing but no crepitations and feeble breath-sounds below this. Posteriorly there was bronchial breathing to the middle of the scapula and crepitations throughout on deep breathing. Other rare sites for empyemata are between the mediastinum and the lung and between the diaphragm and the lung. In treating interlobar cases it is advisable to stitch the lung to the parietal pleura before opening, unless it is already adherent. In ordinary cases the best practice is to aspirate one day, removing as much pus as possible, and operation the next.—*Interlobar Empyema, W. Broadbent, Lancet, November 24, 1928, ccxv, 1075.—(B. T. McM.)*

Spontaneous Pneumothorax.—The author has assembled a large series of cases of spontaneous pneumothorax, and even though the main cause is to be sought in tuberculosis there are quite a few cases in which no relation was determinable even after years of observation. A number of interesting and instructive cases are presented in this light. In these interstitial emphysema plays an important rôle. The author presents a case of spontaneous pneumothorax which has existed in complete form over a period of 20 years. The patient with this condition served in the world war and is to-day still entirely capable of work. These cases point to the fact that the prognosis need not be unfavorable.—*Über besondere Fälle von Spontanpneumothorax, G. Wiele, Beitr. z. Klin. d. Tuberk., 1928, lxviii, 296.—(H. J. C.)*

Spontaneous Nontuberculous Pneumothorax.—A review of the literature from 1844 to the present date allows a tabulation of 84 cases of spontaneous pneumothorax of nontuberculous aetiology. The aetiology and pathogenesis of spontaneous pneumothorax with particular reference to the accompanying compilation was considered. Tuberculous disease is probably the most frequent single cause. Pneumonia follows, with a 35.7 per cent incidence in this tabulation; then emphysema and gangrene. Expressed pathogenetically, pneumothorax may be caused by (1) degeneration in the lung (abscess, gangrene, bronchiectasis, infarction, empyema), or (2) rupture of the lung due to congenital defect, emphysema, foreign body. Pneumothorax, either open, closed, or of the check-valve variety, may be seen as partial or total, unilocular or multilocular, simple or complicated, and unilateral or bilateral. Three cases of nontuberculous

spontaneous pneumothorax are added to the literature: all were postpneumonic and simple (uncomplicated), and made uneventful recoveries. Their recognition was made on the basis of roentgenography; they were characterized by a sparsity of clinical manifestations and signs, which probably would not have sufficed to enable the diagnosis in the absence of the roentgenographs and fluoroscopy.—*Spontaneous Nontuberculous Pneumothorax in Infancy and Childhood, E. G. Stoloff, Am. J. M. Sc., November, 1928, clxxvi, 657.*—*(W. I. W.)*

Traumatic Pneumothorax.—This is a report of a case of pneumothorax developing in a patient as a result of an automobile accident. Six days later probable pneumonia developed. This was followed by an infection of the fluid in the pleural cavity, resulting in empyema which was evacuated about a month after the onset of pneumonia. On account of absorption the high temperature persisted for about two months after operation, and the patient convalesced for another two months. It is worthy of note that the X-ray did not reveal fracture of a rib. The life-saving measures were, above all, aspiration, morphine, digitalis and oxygen. Digitalis was used according to the Eggleston method. The patient lost about 40 pounds, which he later regained. *Conclusions:* The case in point teaches us the importance of prompt aspiration, the long time required for a full absorption of air in pleural cavity, and the necessity of careful watching for a change from serous effusions to empyema.—*Aspiration in Traumatic Pneumothorax, B. T. Tilton and M. J. Schroeder, M. J. and Rec., April 17, 1929, cxxix, 444.*—*(B. T. McM.)*

Pulmonary Embolism.—*Case report:* A white female, age 43, fractured her left tibia and fibula. Six weeks after the accident she lost consciousness and died very suddenly. Postmortem examination revealed, on opening the right ventricle and pulmonary artery, a long clot of about the size of the lumen of the internal iliac vein. This had evidently folded itself so that two ends were passing into the right branch of the pulmonary artery and two into the left, thus preventing the flow of blood to the lungs and producing sudden death. The clot could not be extracted by traction. There was also a free end pointing to the pulmonary valve.—*A Case of Extensive Pulmonary Embolism Following Fracture, V. Cotton-Cornwall and C. W. Ponder, Brit. Med. J., November 23, 1928, no. 3539, 789.*—*(W. I. W.)*

Diagnosis of Diaphragmatic Hernia.—*Case Report:* A man, aged 27, complained of pain in the lower right chest. Roentgen-ray examination revealed diaphragmatic hernia. When diaphragmatic hernia is suspected from physical or roentgen examination, it is necessary to make an unusually careful roentgen examination, particularly with the patient in a lateral position, in order to differentiate true diaphragmatic hernia from thoracic stomach, eventration of the diaphragm, and congenital absence of half of the diaphragm. Thoracic stomach is an entity and can be differentiated from diaphragmatic hernia by roentgenological examination. Eventration of the diaphragm is relatively frequent and can be differentiated from diaphragmatic hernia by lateral roentgenographic examination. Diaphragmatic hernia is to be regarded as congenital unless proved to be of traumatic origin.—*Roentgenological Diagnosis of Diaphragmatic Hernia, L. T. Le Wald, Am. J. Roentgenol. & Rad. Ther., November, 1928, xx, 423.*—*(W. I. W.)*

Hypostatic Pulmonary Congestion.—Hypostatic pulmonary congestion may occur in the aged and debilitated as the result of depressed respiratory motility. In such cases as fracture of the femur an apparent relief of early hypostatic pulmonary congestion has resulted from the intermittent inhalation of carbon dioxide. The rate and duration of the administration of carbon dioxide may be controlled by the respiratory response and the comfort of the patient. Differentiation of pulmonary stasis resulting from respiratory depression and that dependent upon right heart failure must be clearly made, since the use of carbon-dioxide inhalations may be strongly contraindicated in the latter circumstance. Overventilation may disseminate an infection from the bronchi or in the alveoli. Hence carbon-dioxide inhalations are contraindicated in bronchitis or pneumonia and should also be avoided if these conditions be suspected. On physiological grounds a prophylactic value attaches to the use of this measure in all surgical cases meeting the discussed indications, but numbers of cases will be required to establish its value in this relation.—*Carbon Dioxid in the Treatment of Hypostatic Pulmonary Congestion. A Preliminary Report, R. E. Burns and W. S. Middleton, Am. J. M. Sc., April, 1929, clxxvii, 564.*—*(M. P.)*

Bronchohepatic Fistula.—*Case report:* A patient, aged 50, complained of cough with expectoration of yellow sputum following cholecystectomy. Roentgenoscopic studies revealed a high, fixed, right diaphragm, and

an abscess mass near the diaphragm and involving the liver. On cough a column of fluid extended from this mass to the trachea. A diagnosis of subdiaphragmatic abscess and bronchobiliary fistula was made.—*The Study of a Case of Bronchohepatic Fistula with Roentgenoscopic Observations, J. M. Flynn and S. L. Warren, Am. J. Roentgenol. & Rad. Ther., October, 1928, xx, 364.*—(*W. I. W.*)

Massive Collapse of Lung.—The term "massive collapse" has been applied to that condition in which there is total or partial atelectasis of the lung occurring usually after abdominal operations or thoracic traumata. A number of theories have been put forth to account for its occurrence. The most obvious explanation is that the bronchus becomes blocked, probably by mucous; Jackson and Lee have demonstrated the bronchial plug by bronchoscopy. The infrequency of the condition and its resemblance to pneumonia usually leads the clinician astray. The following is a report of two cases: *Case 1:* J. W., white male, aged 18, was admitted for inguinal hernia. Apex beat two inches inside nipple line. Sinus arrhythmia present, with slight roughening of first sound. Double herniorrhapy done. Ether was administered, with nitrous oxide induction. Four days later patient complained of pain, and was dyspnoeic and cyanotic. Temperature 102.6°, pulse 104, respirations 42. Dulness over left lung at base, anteriorly and posteriorly, with occasional crepitant râles. Dulness, with diminished breath-sounds, in left axilla and anteriorly. Roentgenograph showed marked density in lower left pulmonic field with a marked deviation of trachea to left. At this time apex-beat was visible just outside nipple line. Temperature 101.6° at 10 a.m. the same morning, pulse 96, respirations 42. The following day the temperature dropped to 100.4° and remained around this point. There was greenish-yellow sputum, which never became rusty. A roentgenograph showed that the density was already receding and the trachea was but slightly deviated. On this film the elevation of the diaphragm could be observed. Recovery was uneventful. *Case 2:* J. M., male, gave history of having fallen downstairs while intoxicated about twenty-eight hours before admission. Chief complaint at this time was pain in left chest posteriorly. Examination showed prostration with dyspnoea and cyanosis. Hyperresonance over left chest, anteriorly and posteriorly, with subcutaneous emphysema from third rib to base of axillary line. Breath-sounds loud, with scattered fine crackling râles. Exquisite tenderness over 7th, 8th and 9th left ribs. Temperature 99°, pulse 120, respirations 40, blood pressure 125/70. Immediate roentgenographic examination showed deviation of mediastinum, 4 cm. to right, and elevation of right diaphragm 4 cm. Complete fractures of the 6th, 7th and 8th ribs. Very little density on affected side. In spite of this diagnosis of contralateral massive collapse was made. A roentgenograph, made two hours later, showed slight increase in density of right pulmonic field; also small area of increased density opposite 9th left rib posteriorly. On night of admission temperature rose to 103°, and following day touched 105°; it then receded, terminating by lysis on the sixth day of admission. The third day after admission a roentgenograph showed complete opacity of right pulmonic field. On the seventh day it showed a continued opacity, but at this time the mediastinum had begun to shift toward its normal position. Examination on eleventh day showed resolution of upper half and continued opacity in the lower half. Examination on the seventeenth day showed mediastinum in its normal position and a very slight elevation of diaphragm. There were small areas of infiltration remaining in middle and lower lobes. The pleura was thickened laterally, and at two points it appeared to constrict the lung as if by circular bands. Examination on the twenty-third day showed complete resolution of the pleuritic thickenings. There was a group of these pleuropericardial adhesions which were retracting the pericardium which overlay the right auricle. At this time the symptoms have disappeared. *Summary:* It is shown that the unusual radiographic density which is typical of massive collapse may follow, and not be concomitant with the collapse, and it is suggested that the density is due to the influx of a transudate as a result of difference in pressure between alveolar air and the blood-stream. It is further suggested that the slow return of the mediastinum and diaphragm to their normal positions may be dependent on the absorption of the retained secretions.—*The Mechanism of Massive Collapse of the Lung, F. Reibel, M. J. & Rec., October 3, 1928, 321.* (*F. G. P.*)

Postoperative Massive Collapse of Lung.—Postoperative pulmonary complications following abdominal operations fall into three groups. The first is composed of cases exhibiting the essential signs of massive collapse as described by William Pasteur. The second comprises cases which were regarded as postoperative pneumonia, because cardiac displacement could not be demonstrated. The third includes a few easily recognizable complications, notably

those of embolic origin. The author's investigations showed that the majority of all complications were massive collapses, which may or may not be accompanied by demonstrable cardiac displacement. The convalescence of 261 patients from abdominal operations was followed with reference to the possible occurrence of declared or latent alterations in the lungs. The X-ray appearance of massive collapse is very characteristic, particularly when it affects the whole of one lung. The shadow cast by the airless lung is at least as dense as that caused by a thick layer of fluid, and may even obscure costal outlines. The cardiac and mediastinal shadows, including that of the trachea, are much displaced toward the affected side, the diaphragm is elevated, and the ribs fall together so as to assume a tilted appearance. Twining suggested that we should rely on the evidence of displacement of the interlobar septum, as seen in the anteroposterior and lateral views, for the diagnosis of massive collapse, and not on the mediastinal displacement. The first indication of the onset of massive collapse is a mottled appearance in the lung, nearly always in the lower lobe only, on one or both sides, and it appears to be due to areas of lobular collapse, which coalesce to form massive collapse. Nevertheless, it often clears up rapidly; this may happen in one lower lobe, while the other goes on to complete collapse in a few hours. When the lung becomes aerated again it sometimes fails to return at once to its normal volume. Its shrunken condition is partly maintained by the mechanical condition of the pleura, which is altered by the emphysema in the upper lobe, and partly by the effect of inflammatory changes, which may show themselves in pleural thickening and the persistence of small areas of opacity in the hilum region, presumably due to residual consolidation. Of 149 cases of abdominal operations in males, three showed pulmonary collapse with cardiac displacement and six without the latter. Of 112 females, three showed pulmonary collapse with cardiac displacement and six without it. The anaesthetic used does not appear to bear any relation to the frequency of pulmonary complications, but they are more common when weather conditions are adverse. The question of aetiology still remains unsettled. The authors believe that one determining cause is the obstruction of the bronchial tree. Among the predisposing causes there is, first, the hypersecretion caused by the administration of a general anaesthetic, or the hypersecretion due to a pulmonary or cardiac condition which contraindicated an anaesthetic. This hypersecretion is more marked in males than in females, possibly because the respiratory passages of the former are in a constant state of mild irritation from smoking. Second, the position in which abdominal patients are usually nursed tends to the gravitation of these secretions into the bronchi of the lower lobes, which are always affected by massive collapse except when one whole lung is involved. The third is interference with the expulsion mechanism, either by voluntary suppression or by the excessive use of morphia. The symptoms associated with massive collapse vary very widely, and cases may be described, according to their severity, as fulminant, moderate or latent. In a review of the cases in the literature of 1927 Scott found that in 50 per cent the onset occurred within 24 hours of operation, in 20 per cent after 48 hours, and the remaining 30 per cent in the intervening period. It is fairly certain, however, that, in the cases described as coming on after forty-eight hours, it is the recognition of the collapse that is delayed. When the access of air to the alveolar tissue is interrupted, the carbon dioxide and oxygen of the entrapped air are absorbed rapidly. The nitrogen is not fully removed for twenty-four hours, so that when a lung is completely airless the obstruction has been in existence for many hours. After the obstruction has been removed the patient raises large quantities of thick, green mucopurulent sputum. Pneumococci, *Micrococcus catarrhalis* and *Bacillus influenzae* are the organisms most frequently found. Massive collapse and its complications are probably not attended with any material mortality. The cases in which the resulting bronchopneumonia proved fatal form a very small percentage, and although four of the cases in this series came to autopsy there was always some cause of death other than the pulmonary condition. It seems that a true uncomplicated case has never yet come to autopsy. The microscopic appearance of uncomplicated massive collapse is fairly characteristic, but it may be completely overshadowed by secondary inflammatory changes, and in these circumstances due attention must be given to the macroscopic shrinkage and to the absolute airlessness of the affected lung. Pneumonia is a rare complication of abdominal operation. There was only one case of hilum pneumonia in this series, and the gravity of the illness showed at once that the complication was more serious than massive collapse. The treatment of massive collapse should be primarily prophylactic and should consist essentially of postural drainage of the bronchial tree. Forty-seven male cases were treated by this method. The foot of

the bed was elevated twenty inches above the head for twenty-four hours after the operation. None of these cases had massive collapse while this position was maintained. At the end of twenty-four hours radiographs always showed the lower lobes well aerated as compared with the apices, but at varying intervals after return to the horizontal position several of the patients developed mottling of the lower lobe, which in two instances went on to massive collapse without cardiac displacement. This method reduced the incidence of massive collapse and might reduce it still further if the posture is maintained longer. *Conclusions and Summary: 1:* 13.7 per cent of all abdominal operations are followed by pulmonary complications, males being more affected than females and upper abdominal operations more than lower. *2:* Pneumonia occurring after abdominal operation is extremely rare and all these complications consist of massive collapse of the lungs, which may or may not be accompanied by the cardiac displacement on which Pasteur laid such stress. *3:* Massive collapse is due to the obstruction of the lumina of the bronchi, followed by the absorption of the contained air by the blood-stream. This obstruction often affects the larger tubes, but when the incision has been in the upper abdomen the deflation of the lower lobe is so great that the bronchioles may become primarily obstructed. *4:* About one out of every six of these cases exhibits cardiac displacement, depending on the degree of deflation of the lung before the obstruction occurred. *5:* The predisposing causes are the catarrh which follows an anaesthetic, the position in which the patients are nursed, and the inhibition of the cough reflex by pain or the excessive use of morphia. *6:* The clinical features, complications, pathology and diagnosis of massive collapse are described. *7:* Certain measures of treatment are advised, with special reference to postural drainage.—*Post-Operative Massive Collapse, C. R. Boland and J. E. Sheret, Lancet, July 21, 1928, ccxv, 111.*—(*F. G. P.*)

Acute Massive Collapse of Lung.—Massive collapse of the lung is a definite clinical entity of which the finally determined aetiological factor is total occlusion of a bronchus with subsequent absorption of retained air. The principal physical sign is mediastinal displacement toward the involved lung. The mediastinal displacement including the heart is due to the potential thoracic vacuum created by the collapsed pulmonic area and is directly proportional to the degree in which the vacuum is relieved by emphysema of the opposite lung. Roentgenoscopy affords the best diagnostic method. Bronchoscopic drainage is an important method of treatment.—*Acute Massive Collapse (Atelectasis) of the Lung, D. R. Bowen, Am. J. of Roent. & Rad. Ther., February, 1929, xxi, 101.*—(*W. I. W.*)

Collapse of Lung.—A case is reported of pulmonary tuberculosis in which roentgenray studies revealed collapse of the lower lobe of the right lung and later collapse of the upper lobe of the same lung. It was definitely proved that this condition was due to bronchostenosis in a main-stem.—*Collapse of the Lung Occurring in Pulmonary Tuberculosis, J. Sproull, Am. J. Roentgenol. & Rad. Ther., November, 1928, xx, 419.*—(*W. I. W.*)

Atelectasis.—The occurrence of pulmonary atelectasis is reported in a case of pneumonia and in one of cancer of the stomach. Pulmonary atelectasis occurs more frequently than is generally recognized in association with nonsurgical and nontraumatic cases. It is a definite clinical entity and readily diagnosed by the physical signs and clinical course. Until more conclusive evidence is presented, the mechanical-obstruction theory as to aetiology is the most plausible, since removal of the obstruction has resulted in prompt reëxpansion of the lung. Experimentally the condition has been reproduced in animals by the injection into their bronchi of material removed from the bronchi of patients suffering from pulmonary atelectasis. The abolition of the cough reflex in dogs, followed by the introduction of an acacia solution into their bronchi, has produced pulmonary atelectasis, which disappeared when the acacia solution was aspirated through the bronchoscope.—*Acute Massive (Nonsurgical, Nontraumatic) Pulmonary Atelectasis. Report of Two Cases, H. K. Mohler, Am. J. M. Sc., April, 1929, clxxvii, 507.*—(*W. I. W.*)

Intrapleural Pressures in Massive Collapse of Lung.—Four cases of atelectasis of the lung in which the aetiological factors were trauma to the thighs and pelvis, chronic pulmonary tuberculosis, tumor mass in a bronchus, and thoracic aneurysm, are reported. A marked increase in intrapleural negative pressure has been demonstrated in each. High negative intrapleural pressures are always associated with and are characteristic of massive collapse. This pressure change is directly responsible for the physical findings of cardiac displacement, and is the factor underlying the symptoms of dyspnoea and cyanosis. Partial pneu-

mothorax, reducing the negative pressure to within normal limits, has given immediate symptomatic relief.—*Intrapleural Pressures in Massive Collapse of the Lung, C. C. Habliston, Am. J. M. Sc., December, 1928, clxxvi, 830.*—(*W. I. W.*)

Primary Tumors of Lung.—In the symptomatology of lung tumors certain observations are of great diagnostic value when properly interpreted. Blood-spitting, occurring for the first time in one past middle life, should create suspicion of possible pulmonary malignant tumor. Dyspnoea at that age, in the absence of cardio-renal disease, warrants careful investigation. Severe and prolonged chest pain is an early persistent and cardinal symptom of pulmonary neoplasm, and does not disappear with appearance of pleural effusion, as in tuberculosis. Afternoon elevation of temperature is present in about 50 per cent of pleuropulmonary cancers. An apparently idiopathic pleural effusion, especially if sanguineous, may be the first indication of tumor. From the roentgenological point of view, pulmonary malignant conditions can be conveniently classified into (1) pulmonary, including endobronchial, hilar, lobar and excavating forms, and (2) pleural, with and without effusion. Early bronchogenic tumors, which have not become large enough to obstruct the bronchus, and flat pleural tumors may be missed roentgenologically, although physical observations point to their existence. In early cases hilar tumors and those that spread along the bronchial arborization and lymphatic vessels may present no physical signs because there has been no atelectasis following a plugged bronchus. Central tumors are visible roentgenologically long before there are any definite physical signs. Chronic interstitial pneumonia may simulate a lobar malignant tumor on both physical and roentgenological examination. In the lobar type of tumor there can sometimes be seen definite pencil-like areas of rarefaction radiating from hilum to periphery. These are probably dilated bronchi distal to an obstructed bronchus. Apparently spontaneous localized empyemata and pulmonary abscesses in elderly patients are frequently due to hidden malignant neoplasms of the excavating type, which often closely simulate abscess or gangrene of the lung. Symptomatology is most important here. In the presence of large pleural effusions, primary lung tumors cannot be diagnosticated by means of the roentgen ray unless the fluid is aspirated and a diagnostic pneumothorax induced for contrast purposes. In difficult cases, films in the oblique positions, bronchography with iodized oil and early bronchoscopy must be resorted to for a correct diagnosis.—*The Roentgen Ray in the Diagnosis of Primary Pulmonary Neoplasm: Report of Case, B. P. Stivelman, J. Am. M. Ass., December 1, 1928, xci, 1690.*—(*G. L. L.*)

Primary Cancer of Lung.—There has been a definite increase, both actually and relatively, in the incidence of carcinoma of the lung in Germany since 1913, and especially since 1918. Far more men than women are affected. Race seems to have something to do with this. Russian and Polish Jews have an exceptionally high incidence of the disease. The cause of the increase cannot be definitely associated with inhalation of dust, tarring of streets, injuries peculiar to occupation, excessive use of tobacco, or influenza, tuberculosis or other diseases.—*Ueber primäre Lugenkarzinome, A. Konrad and W. Franke, Deutsche med. Wchnschr., April 19, 1929, lv, 652.*—(*H. S. W.*)

Lung Tumors.—Beyond doubt there is a true increase in the incidence of pulmonary neoplasms. They are found in 7 per cent of all autopsies on patients dead from carcinoma. The percentage of early correct diagnosis is not generally greater than 33 per cent. In the early stages there is little deterioration in the general condition. The characteristic radiological findings in the early stage are density of the hilum, atelectasis and bronchiectasis. The most frequent sources of difficulty in diagnosis in this series of cases were tuberculosis and mediastinal tumor. Twenty-one of the cases were histologically of the "oat-celled" type. Clinically it was not possible to distinguish different histological types. The rates of men to women affected were approximately 3 to 1. A somewhat marked incidence of previous lung affections, especially influenza and bronchitis, was found. No connection between the incidence of growth and occupation could be traced. Especially common modes of onset were (1) with pain in the chest alone and (2) with an acute febrile attack of "influenza" followed by a temporary return to work. Early pressure signs were frequent, and should not necessarily suggest mediastinal tumor rather than a pulmonary growth. The average age of the patients was over 50, and the duration of disease was 6 months. Haemoptysis occurred in 40 per cent and pleurisy with effusion in 48 per cent of these cases. The apex beat was unaltered in 40 per cent. Metastases were not a frequent cause of symptoms.—*Pulmonary Neoplasms. A Report of Twenty-six Cases, T. C. Hunt, Lancet, April 13, 1929, ccxvi, 759.*—(*B. T. McM.*)

Benign Tumors of Bronchus.—A case is cited in which a patient with pulmonary symptoms was treated for tuberculosis, asthma, chronic pulmonary fibrosis and myocarditis, while the basis for his trouble was a fibrolipoma in the left main bronchus. This case demonstrates the importance of including bronchoscopy in the study of pulmonary conditions with obscure or atypical symptoms. It also demonstrates that we can hope to save the lives of patients who have benign neoplasms of the bronchus by timely bronchoscopy.—*Benign Neoplasms of the Bronchus, M. C. Myerson, Am. J. M. Sc., November, 1928, clxxvi, 720.*—(*W. I. W.*)

Carcinoma of Bronchi.—Four cases of extrathoracic new growth with metastasis to the tracheobronchial lymph nodes causing bronchial compression are reported. The chest symptoms and signs simulated primary bronchial carcinoma. There is often considerable difficulty in differentiating primary and secondary carcinoma of the bronchi. These secondary growths may actually invade the bronchial wall in such a manner that bronchoscopist and microscopist likewise may be confused with regard to the point of origin of the new growth.—*The Differential Diagnosis of Primary and Secondary Carcinoma of the Bronchi, E. Weiss, Am. J. M. Sc., April, 1929, clxxvii, 487.*—(*W. I. W.*)

Bronchogenic Cancer.—A report is presented of a case in which there was reason to suspect an infection with *Endamoeba histolytica*, but which proved to be bronchogenic carcinoma associated with hydrothorax, mucoid infiltration of the lung and disease of the gall-bladder and kidney. Certain cells, when observed on the warm stage, manifested activity and assumed morphology that might readily lead to confusion with amoebae. Cells of the human body, especially histiocytes, under pathological conditions simulated amoebae when viewed in sections stained either with haematoxylin and eosin or with iron haematoxylin.—*Bronchogenic Squamous Cell Carcinoma. Report of a Case Associated with Pleural Effusion and Pulmonary Osteo-Arthropathy, with Features that Simulated Infection by Endameba Histolytica, R. G. Mills and Nolie Mumey, Arch. Int. Med., April, 1929, xliii, 516.*—(*W. I. W.*)

Diagnosis of Bronchial Carcinoma.—The frequency of erroneous diagnosis in bronchial carcinoma varies, according to different authors, between 17 and 53 per cent. The reason for the relatively high incidence of failure is due to the fact that the symptomatology of the disease is not characteristic and is frequently vague. The history is sometimes suggestive. The most frequent complaints are persistent cough, at times bloody expectoration, dull or burning pain in the chest, dyspnoea and sometimes night-sweats. The clinical findings vary according to the size and localization of the tumor. The only characteristic sign is that of bronchial stenosis which does not occur in all cases. In carcinomas of the upper lobe one always finds dulness in the region of the manubrium, which is important in the differential diagnosis against fibrous pleuritis of the mediastinum; the latter is always associated with a denudation of the homolateral part of the heart. Bronchial carcinoma is frequently complicated by exudative pleurisy, and frequently with haemorrhagic exudate. The differential diagnosis with tuberculous pleurisies can be ascertained by tuberculin test, which is practically always negative in the presence of carcinoma. Stasis in the area ot the superior vena cava with oedema and cyanosis of one-half of the face and one arm, is important, if present. Paralysis of the phrenic and vagus nerves may occur with any kind of mediastinal tumor. The immediate neighborhood of the tumor shows usually chronic pneumonic processes; they may help to establish the diagnosis. It is a valuable rule to suspect bronchial carcinoma in every case of chronic pneumonia for which other aetiologic causes cannot be established. The metastases caused by bronchial carcinoma are found most frequently in the draining lymph nodes, liver, kidneys, and thyroid gland. The central nervous system is affected in 10 to 20 per cent of the cases. The favorite site of cerebral metastasis is the area which is supplied by the artery of the Sylvian fissure. The symptoms which are produced by cerebral metastases may entirely obscure the picture of the primary disease.—*Zur Diagnose des Bronchuskarzinoms, H. Mayrhofer, Wien. klin. Wchnschr, November 15, 1928, xlvi, 1586.*—(*M. P.*)

Antagonism between Cancer and Tuberculosis.—Statistical analysis of autopsy records of 816 persons with malignant tumor and an equal number of nonmalignant-disease cases shows that in the former group 6.6 per cent and in the latter group 16.3 per cent had coexisting tuberculosis. "In general it must be concluded that there is a definite and marked incompatibility or antagonism between the two diseases, cancer and tuberculosis, of such sort that both occur together at the same time in florid activity in the same individual only with great rarity."—*Cancer and Tuberculosis,*

R. Pearl, Am. J. Hyg., January, 1929, ix, 97.—(H. S. W.)

Roentgen Therapy and Colloidal Lead in Malignant Tumor.—In the course of a year 7 patients showing inoperable malignant tumors were treated with colloidal lead, administered intravenously in doses of 50 mgm. at weekly intervals, in conjunction with daily roentgen treatment. A solution of colloidal lead was used, to which dextrose had been added after sparking, increasing its stability markedly, and at the same time apparently lowering its toxicity. A case is reported of inoperable round-cell sarcoma of the pelvic bones, with metastases to the lungs, which was apparently controlled over a period of a year by radium and roentgen therapy, causing the pulmonary metastases to disappear and inhibition of the original tumor. The patient returned six months later and died in five months, despite further roentgen treatment and colloidal lead intravenously. In another case of sarcoma of ribs and pleura a definite remission occurred, but there is later pulmonary involvement. Any transient, but definite, improvement that occurred in the 7 cases, was, so far as could be ascertained, attributable more to the effects of high-voltage roentgen therapy than to the colloidal lead.—*Colloidal Lead with High Voltage Roentgen Therapy in Malignant Disease, C. A. Waters, J. A. C. Colston and L. N. Gay, J. Am. M. Ass., January 5, 1929, xcii, 14.—(G. L. L.)*

Roentgenography of Miliary Tumor Metastases and Miliary Tuberculosis.—It has been doubted whether a miliary (haematogenous) spread of tumor metastases ever occurred in the lung. Lorenz claimed that such appearances are always due to a generalized lymphangitis, and proposed to substitute the term "miliary carcinosis" by "lymphangitis carcinomatosa." It is obvious that a lymphangitis cannot produce exclusively nodular shadows since not all thickened lymphatics can be met by axial rays. X-ray pictures of miliary metastases resemble greatly those of miliary tuberculosis. To arrive at a correct differential diagnosis, it is necessary to study the distribution, the number, and the size of the shadows. In miliary metastasis more foci are found in the lower parts of the lungs. The size of the individual shadows increases from apex to base. In miliary tuberculosis, both number and size of the individual foci decrease from apex to base.—*Zur Differentialdiagnose zwischen der Miliaren Tumorose und Tuberkulose im Röntgenbilde, R. Lenk, Klin. Wchnschr., July 22, 1928, xxx, 1414.—(M. P.)*

Inoculation of Chickens with Hodgkin's Disease Nodes.—The possibility has been entertained that some of the cases clinically designated as Hodgkin's granuloma may be tuberculous and that others are neoplastic. It is highly possible that the disease may start as a granuloma and end in certain instances as a neoplasm. On the other hand, according to Symmers, Hodgkin's disease is neither an infectious granuloma nor a neoplasm, but a systemic disease. Most students of the disease, impressed by its evident granulomatous character, have leaned to the idea that it is more or less closely related to tuberculosis. Sternberg in 1898 first maintained that Hodgkin's disease had a common aetiology with tuberculosis. Kurt Ziegler states that 20 per cent of cases of Hodgkin's disease are associated with tuberculous infection and that 10 per cent gave tubercle bacilli by inoculation. Sticker has reported that tubercle bacilli, possibly of the bovine variety, may be demonstrated in Hodgkin's nodes by the repeated passage of the material through guinea pigs. Other investigators hold strongly to the view that the presence of tubercle bacilli and lesions in Hodgkin's disease is merely coincidental. An argument in favor of this is the fact that the majority of inoculations of the guinea pig with Hodgkin's-disease material have resulted negatively for tuberculosis. In other words, tubercle bacilli when found seem to represent an independent infection. Although there is much evidence of the tuberculous nature of Hodgkin's disease, it is obvious that, if the disease is tuberculous, then either the bodily influence of the host on the course of the tuberculous infection is unusual or the infecting microörganism must be atypical. It occurred to the writer that the latter possibility would be realized, if the tubercle microörganism in Hodgkin's disease was not the usual human and bovine forms but the hitherto completely ignored avian tubercle bacillus. In the past only guinea pigs, rabbits, and monkeys have been used for the study of avian tuberculosis, that is, animals which are relatively insusceptible or immune to this disease. The correctness of the idea just stated could be tested only by the inoculation of Hodgkin's nodes into birds, an experiment which, so far as can be ascertained, has not been reported heretofore. Therefore, in November, 1926, a series of experiments on chickens was undertaken to determine, if possible, whether a relationship exists between avian tuberculosis and any form of the disease known clinically and histologically as Hodgkin's granuloma. The material for inoculation was obtained fresh from two cases of Hodg-

kin's disease at operation and these were later identified as histologically characteristic of this disease. Under aseptic conditions the ground nodes were emulsified in physiological salt solution, strained through sterile cheese-cloth, and inoculated intravenously into the wing-vein of chickens within a few hours after the node was removed. These chickens (five) were kept under ideal conditions in the open and in the country, free from exposure to any form of disease. Two control birds, kept under the same conditions, did not develop any similar lesions in the same period of time. All the infected chickens developed either a typical or an atypical tuberculosis, and in the tissue smears acid-fast granules and rods, extra- and intracellular, were demonstrated in three, and non-acid-fast granules in one instance. Reinoculation of material from the lesions of one of these chickens into another chicken produced an identical though more extensive manifestation of the disease. An atypical tuberculosis developed in a guinea pig from inoculation of the tissues of one of the chickens, and a growth of bacteria with the staining and cultural characteristics of the avian tubercle bacillus was produced on egg media from material from the guinea pig. Direct cultures from the birds were contaminated in all instances. These cultures were reinoculated into normal chickens and guinea pigs, but sufficient time has not elapsed to determine the results of this reinoculation. Two other chickens injected with typical human tuberculous lymph nodes did not develop any similar lesions in the same length of time. This shows that the injection of lymph-node emulsion does not produce the lesions encountered, and indicates that a more or less specific reaction is being dealt with and not a foreign-body granuloma. The histological findings encountered in the experimental chickens bore a striking resemblance to that of the different forms of Hodgkin's disease, and, since the histological structure of the Hodgkin's lesion is so characteristic as to be readily recognized, this resemblance indicates either that chickens react in a more or less specific way to the inoculation of Hodgkin's nodes, or that Hodgkin's disease is closely related to avian tuberculosis. *Conclusions:* While the possibility cannot be absolutely excluded of accidental avian infection, the findings seem to justify the conclusion that in these chickens a lesion with the histological features of Hodgkin's granuloma and comparable to avian tuberculosis has been produced after the inoculation of the emulsified Hodgkin's nodes. This may indicate that the aetiological agent in certain forms of Hodgkin's disease is pathogenic for chickens, or that avian tubercle bacilli are a factor in producing some of the lesions which are interpreted as Hodgkin's disease. Reproductions of photomicrographs and other plates accompany the article.—*Experimental Inoculation of Chickens with Hodgkins Nodes, Elise S. L'Esperance, J. Immunol., January, 1929, xvi, 37.—(J. S. W.)*

Silicosis and Tuberculosis.—Phthisical patients should not engage in occupations involving the risk of exposure to silica dust. They are apt to develop silicosis, which considerably adds to the gravity of the prognosis. Prophylactic measures should be considered, as miners suffering from silicosis are unduly susceptible to tuberculosis. Why this is so has not been satisfactorily explained. The pathology of silicosis may be summarized as follows: *1:* The free silica dust having found its way into the alveoli of the lungs, is taken up by certain cells of doubtful origin, probably endothelial, which are known as "dust" cells. At first these cells have a clear path along the lymphatics of the lung, and are able to reach the tracheobronchial group of lymph nodes at the root. These nodes then enlarge and become fibrotic. If dust inhalation goes on, the lymphatic channels in the lung become blocked and the dust cells collect in pseudotubercles at the small nodes or those at the branching of the bronchi and bronchioles. *2:* With continued stasis of the lymphatic circulation, the dust cells go on accumulating in the small nodes at the bifurcation, and these become larger and develop into fibrous nodules of varying size. *3:* If the silicosis progresses the next stage is that of further enlargement of the nodules, with coalescence of the smaller ones and some degree of interstitial fibrosis. *4:* If now tuberculosis or other infection is superimposed on the silicosis, large irregular areas of fibrosis are found, with pleurisy and other complications. The second, third and fourth stages have rather characteristic X-ray appearances.—*Silicosis and Tuberculosis, J. L. Stewart, Brit. J. Tuberc., January, 1929, xxiii, 6.—(B. T. McM.)*

Action of Silica on Lungs.—There are two main ideas as to the mode of action of silica and other dusts upon the lung. One holds that the particles traumatize the lungs: the other that collodial silica exerts a chemical (toxic) effect on the lungs. Much of the dust we breathe is ultramicroscopic and is in the region of the molecule (in size) where surface tension, surface energy and electrical change are of considerably more importance than hardness, sharpness, etc. It has been

clearly shown that colloidal silica does definitely injure tissues. When injected into tissues, it produces a coagulum in which tubercle bacilli grow when introduced. Yet, if silica is a "protoplasmic poison," as is frequently asserted, why do tubercles appear to thrive in silica-areas in the tissue? Silica exists in all vegetable foods and in the connective tissue of all of us. May it not be that the action of colloidal silica sol on animal tissues is an adsorptive and coagulant one, in which it acts not as a poison but as a colloid, adsorbing body fluids, producing coagulation, agglutination, etc., because it is a colloid of great surface energy.—*The Method of Action of Silica Dust in the Lungs, P. Heffernan and A. T. Green, J. Indust. Hyg., October, 1928, x, 272.*—(*H. S. W.*)

Silicosis among Subterranean Rock Drillers in New York City.—It is not generally known that there are about 2,000 men employed chiefly underground in New York City as drillers, excavators, blasters, etc. Careful physical and roentgenological examinations done on 230 of these workers form the basis of this report. The type of rock in New York and vicinity varies a good deal and contains total silica of from 56 to 94 per cent and free silica from less than 1 to 84 per cent. Of 208 men completely and satisfactorily examined 43 per cent were negative, 23 per cent were diagnosed anteprimary silicosis, 19 per cent first-stage silicosis, and 15 per cent second- and third-stage silicosis. A majority of the men were between 30 and 55 years of age. The largest proportion of the "negative" cases fell in the age-group 25 to 29, and the largest number of first-stage silicosis were 50 to 54 years, while the second and third stages fell chiefly into the 40 to 44 and 55 to 59-year groups. One-third of the workers were colored. In these no excessive silicosis was found, but they were slightly younger than the whites. Over 35 per cent of the 208 had been exposed less than 10 years. Most of the second- and third-stage cases had been employed from 20 to 29 years, and nearly all of them had been employed from 10 to 39 years. This does not represent continuous employment, since no account was taken of unemployment periods. Blasters had considerably more silicosis and more advanced silicosis than the other workers; next in order of frequency came drillers, and after that excavators. The most common symptoms were dyspnoea, pain in the chest, and cough, and these were more frequent in proportion to the extent of the disease. In later stages, râles, diminished breath-sounds and diminished resonance were much in evidence. Of the 208 people 6 cases of active and 13 cases of "healed" tuberculosis were found. Two of the active and four healed occurred in the group which had no silicosis. In summary, 57 per cent of these workers were found to have silicosis; later stages of silicosis occurred four times as frequently in underground as above ground or open-pit workers, and in the later stages a history of pleurisy and pneumonia was frequently encountered. Contracts have already been let in the city which will require the labor of 5,000 men in this kind of work for six years. Measures for the protection of such employees is essential, as regards both the reduction to the greatest possible extent of the rock-dust concentration and the protection of the workman against inhalation of the dust. Several schemes are now under trial.—*Silicosis Among Drillers, Blasters, and Excavators in New York City, Based on a Study of 208 Examinations, Adelaide R. Smith, J. W. Fehnel and the Silicosis Committee of the Columbia University, Metropolitan Life Insurance Co., N. Y. Tuberculosis and Health Association, etc., J. Industr. Hyg., February, 1929, xi, 37.*—(*H. S. W.*)

Syphilis of Lungs.—According to the largest statistics on necropsies, it may be assumed that in 0.3 to 0.5 per cent of syphilitic patients lesions of pulmonary syphilis are found. They occur more frequently in the male than in the female, and more frequently in the fifth decade than at any other time. The pathologic-anatomical diagnosis of congenital pulmonary syphilis is easy because the spirochaetes can be demonstrated in every case. The histological changes consist either of an interstitial pneumonia or of so called *pneumonia alba.* Circumscribed gummata are rare. In all cases circular connective-tissue proliferation is frequently found around the arteries. The diagnosis of acquired pulmonary syphilis in the adult is more difficult, especially since the demonstration of spirochaetes is usually unsuccessful. Definite findings can be expected only in the tertiary form. The most important lesion is interstitial pneumonia with massive production of connective tissue. Such lesions go under the name of "indurative or sclerotizing pulmonary syphilis." The scar-tissue follows usually the bronchi, the arteries and the interlobular septa. This may lead to the appearance of a *pulmolobatus.* The gummatous type is much rarer. The granulation tissue may caseate, but it liquefies only rarely. These lesions almost never contain lime salts. They are rarely found in the apices and most frequently in the right middle lobe. The histological picture shows necrosis with slow destruction of all elastic fibres, and obliterated and caseated blood-

vessels with fibrosis in the caseation. The necrotic foci are surrounded by a zone of connective tissue with many small blood-vessels which show a productive endarteritis. Circumscribed foci may be found in normal or emphysematous lung tissue. Within the larger lesions very small subacute inflammatory nodules may be found. The blood-vessel changes are the most characteristic findings. The clinical picture of pulmonary syphilis has nothing strictly characteristic to ensure the diagnosis. The symptomatology may be very similar to pulmonary tuberculosis; for instance, cough sometimes in spasms, dyspnoea, sputum sometimes sanguineous, sweats, emaciation, persistent pleuritic pain and dull pain in the sternum and between the scapulae. Fever is less frequent than in pulmonary tuberculosis, but it occurs even to high degrees. The sputum is usually in small amount; it may be foetid if bronchiectasis coexists. The constant absence of tubercle bacilli should draw attention toward the right diagnosis. A positive serological reaction is of prime importance. This may be more strongly positive in the pleural exudate, if it exists, than in the blood. The physical findings may be those of an acute or chronic bronchitis, with or without bronchiectasis, or that of acute or chronic pulmonary infiltration with or without exudative or adhesive pleuritis. All findings are usually more localized in the middle and lower portions of the lung than in the apical parts. Râles are usually more dry, and frequently bronchitic râles are heard. Massive cirrhosis and mediastinal retractions are frequent. The roentgenological appearance is not characteristic. Gummata may give pictures similar to tumors. All shadows are usually hard and well defined. The lesions are usually of maximum intensity near the hilum. It is important to watch for other roentgenological signs of syphilitic infection, such as aortitis or aneurysm. The clinical course is not characteristic and may closely resemble pulmonary tuberculosis. It is usually slow, but high temperature may occur. The tendency to shrinking, emphysema, and retraction is pronounced. Circulatory embarrassment and maximal cyanosis may develop. The diagnosis is difficult, and there is no one symptom or sign under which the diagnosis can be made. The coincidence of the absence of tubercle bacilli, a positive serological test and cirrhotic changes in the lung is highly suggestive. In many cases the diagnosis can only be established by the result of specific therapy, which usually brings prompt relief, although the roentgenological appearance may not change considerably. One should, however, be very careful not to explain any and all pulmonary pathological changes, in the presence of a positive serological test, as caused by pulmonary syphilis. The treatment is the same as in other cases of tertiary syphilis.—*Die Lungensyphilis, H. Deist, Klin. Wchnschr., February 12, 1929, vii, 314.*—(*M. P.*)

Tuberculosis in Congenital Syphilis.—It is pointed out by the author that the combination of tuberculosis and congenital syphilis is not so rare in children, and it is recommended that a careful control be observed with the Wassermann reaction. Blood withdrawn by venous puncture can be utilized coincidently for the Wasserman and the red-cell sedimentation reactions.—*Tuberkulose und kongenitale Lues, G. Baer, Beitr. z. Klin. d. Tuberk., 1928, lxviii, 181.*—(*H. J. C.*)

Treatment of Actinomycosis of Lungs.—Two cases of pulmonary actinomycosis were treated with potassium iodide and responded favorably to this form of simple medical treatment. Lipiodol was given intramuscularly twice weekly, starting with 1 cc., and increasing up to 10 cc., and potassium iodide, 10 gr., was given three times daily by mouth.—*Pulmonary Actinomycosis, T. W. Preston, Brit. M. J., December 29, 1928, no. 3547, 1172.*—(*W. I. W.*)

Treatment of Actinomycosis with Iodine.—Four cases of actinomycosis of the jaw are reported, which were cured by small doses of iodine administered in milk. It appears that the iodine unites with cream to produce an iodized fat.—*Treatment of Actinomycosis, H. Chitty, Brit. M. J., February 23, 1929, no. 3555, 347.*—(*W. I. W.*)

Pulmonary Miliary Torulosis.—Most of the reports of pulmonary infection with *Torula histolytica* describe chronic lesions, and not lesions comparable to miliary tuberculosis of the lungs. A case is reported of a negress, aged 30, who developed fever to 102° and a few râles in the left lung eight days after removal of uterine fibromata of five years' standing. Fever persisted, with changes in the accessory nasal sinuses, and a severe continuous headache. The spinal fluid contained 520 cells. A tentative diagnosis of tuberculous meningitis was made, until three weeks later cultures of the fluid revealed *Torula histolytica*. The symptoms were those of a chronic meningitis, persistent headache an outstanding symptom, and the patient died three months later. At post-mortem the meninges were found involved, and there were chronic torula tubercles of

the dura along both middle meningeal arteries and gasserian ganglia, with erosions of the inner tables of the greater wings of the sphenoid, as well as acute disseminated miliary torulosis of the lungs. The cut-surface of the lungs revealed gray-red, slightly raised, irregular, granular torula tubercles about 1 to 3 mm. in diameter, with intervening lung tissue dark red with haemorrhage and hyperaemia. In the upper portion of the lung the tubercles comprised 60 per cent of the pulmonic substance. Microscopic examination revealed a cellular exudate containing torula organisms singly and in clusters, but there was no destruction of pulmonic tissue, and no new connective tissue. Acute miliary torulosis follows a blood-stream dissemination of the micro-organisms from some chronic lesion. In this case all the pulmonary changes were acute. The location of the tubercles along the gasserian ganglia and meningeal arteries suggests that the infection extended along these structures from the nasopharynx.—*Acute Miliary Torulosis of the Lungs, E. F. Hirsch and G. H. Coleman, J. Am. M. Ass., February 9, 1929, xcii, 437.*—(*G. L. L.*)

Undulant Fever.—*Brucella melitensis* infection is characterized by waves of fever alternating with afebrile periods. Chills, sweats, anorexia and loss of weight accompany the fever in almost all cases. The diagnosis of undulant fever is confirmed by obtaining the microörganism by blood-culture and by agglutination tests. It is a general consensus of opinion that agglutination in a dilution of 1 to 50 or higher is evidence of *Brucella melitensis* infection. An increasing number of case reports in the literature shows the more frequent recognition of *Brucella melitensis* infection. Six further contrasting cases are reported. Three of these originated in Michigan, with infection no doubt from the bovine source; the remaining 3 were in Utah, with goat's milk as the presumable source of infection. It seems probable that the infection resulting from the goat strain of the microörganism is more likely to produce a more serious clinical course.—*Undulant Fever (Brucella Melitensis), R. H. Kampmeier, Am. J. Roentgenol. & Rad. Ther., August, 1928, clxxvi, 177.*—(*W. I. W.*)

Undulant Fever.—*Brucella melitensis var. abortus* infection is widely prevalent in cattle throughout the country. The micro-organism is pathogenic for man. An increasing number of case reports from all parts of the country points to the growing importance of this disease as a public-health problem. Especially in rural communities and small towns is the problem acute because of the twofold danger of infection,—direct contact with infected animals, and the commoner utilization of raw milk. There is as yet a very low index of clinical suspicion of the presence of the disease on the part of general practitioners, and as a result many cases are in all likelihood going undiagnosed. Clinical consciousness of the disease will lead to the routine testing for brucella agglutinins in all undiagnosed fevers. With the view of furthering such a clinical consciousness the clinical data of available American case reports have been compiled, together with the more important procedures.—*The Clinical Aspects of Brucella Melitensis Var. Abortus Infection in Man, R. A. Kern, Am. J. M. Sc., September, 1928, clxxvi, 405.*—(*W. I. W.*)

Psychoses and Tuberculosis.—It has long been claimed that people affected with psychiatric diseases have a higher tuberculosis mortality than the general population. If one wishes to compare the two groups, it is necessary not to include the age-groups below fifteen years of age and above seventy years of age in the normal control group, since individuals belonging in these age-groups are hardly ever inmates of an insane asylum. Extensive statistics have been published on the subject. Those from the insane asylums of Saxony for the years 1900 to 1924 show that 54 to 1,116 patients have died of tuberculosis in 10,000 inmates. The large fluctuations are due to the influence of influenza and typhoid epidemics and of war conditions. If these figures are compared with the tuberculosis mortality in Saxony for the age group of fifteen to seventy, it is found that 3.1 to 9.5 as many insane patients as normal people have died. If psychiatric diseases as direct causes of death are omitted, approximately 25 per cent of all deaths in asylums are due to tuberculosis, showing the prominent part which the disease plays. The relation of insanity to tuberculosis is still a question of much conjecture. Exposure to the infection, on account of the impossibility to maintain a good hygienic condition is increased, early symptomatology is usually not noted, and crowding may be an additional factor to explain the high mortality rate. Many authors, however, claim that insanity predisposes to tuberculosis regardless of external factors. Others claim that tuberculosis plays an important rôle in the pathogenesis of insanity. All statistics show that the coincidence of dementia praecox and tuberculosis is much higher than that of tuberculosis and any other type of psychiatric disease. Only manic depressive insanity, a relatively rare

disease, is frequently associated with tuberculosis. It is reasonable to assume that there is a greater susceptibility of insane individuals to tuberculosis, since their greater susceptibility to various other diseases is a well-established fact. It is further noteworthy that the asthenic type, which is quite frequently found in dementia praecox, is frequently the type to be found among tuberculous patients. Luxenburger compared the tuberculosis mortality among normal sisters and brothers of manic depressive and schizophrenic patients with the tuberculosis mortality of sisters and brothers of mentally sound persons. His results were as follows: The tuberculosis mortality among the nonpsychotic sisters and brothers of schizophrenics is approximately four times as high as that of sisters and brothers in the general population. The nonpsychiatric sisters and brothers of manic depressives have approximately the same tuberculosis mortality as the general population. The higher mortality in schizophrenic families is undoubtedly an hereditary factor. It is assumed that there exists a positive correlation between the disposition to dementia praecox and the hereditary weakness of tissues which entails a lowered resistance to tuberculous infection.—*Geisteskrankheit und Tuberkulose, H. Werner, Klin. Wchnschr., February 19, 1929, viii, 367.*—(*M. P.*)

Preventive Inoculation with BCG.—In the past the many attempts to establish a reliable system of vaccination against tuberculosis have failed because it was not realized that the essential character of tuberculosis immunity is very different from that of immunity which can be developed against the majority of microbean diseases. In tuberculosis, as in syphilis and certain illnesses due to protozoa (for instance, piroplasmoses), immunity, interpreted as a resistance to infection, only appears when the body harbors some elements of the specific parasite, and with the express condition that these elements are living, are in sufficient number, and possess such diminished virulence as will not give rise to grave lesions or produce functional trouble incompatible with life. This fact is now universally admitted. Hence, to make the body resistant to virulent tuberculous reinfections we must first seek to produce in them a tuberculous infection which shall have as little virulence as possible, and which can be borne without bringing about what is usually called "tuberculosis-sickness." It has been found difficult and dangerous to utilize for this purpose living bacilli of normal virulence or spontaneously weakened on account of the danger of producing grave tuberculous lesions. Protection could only be attempted with a vaccine prepared from bacilli artificially and hereditarily weakened and definitely rendered incapable of producing active infection in the body called upon to receive it, and also the human subjects and animals met with in the environment of the vaccinated subjects. The author believes that this fundamental condition has been met by his *BCG* (Bacillus Calmette-Guérin) vaccine. In conjunction with his colleague, Guérin, he has succeeded in obtaining from cultures grown for thirteen years on a very alkaline ox-bile medium a strain of tubercle bacilli, which, while keeping their original antigenic properties, have definitely lost all aptitude for actively creating tuberculous lesions transmissable by reinoculation on such a sensitive animal as the guinea-pig. This strain has been used since 1921 under the name of *BCG* in experiments in vaccinating young calves and children. The complete innocuousness of *BCG* having been demonstrated for all animal species, including anthropoid apes, and its protective efficiency with regard to natural infection by close cohabitation between healthy vaccinated animals and contagious tuberculous animals having been established, in July, 1921, a new born child, aged six days, whose tuberculous mother had just died and who would have to be brought up by a grandmother suffering with pulmonary tuberculosis, was vaccinated with the strain. The child was then almost certainly doomed to death but stood the vaccine well (by mouth) and is still living in perfect health although continuously for two years in tuberculously infected surroundings. From July, 1924, experiments were continued on over 300 children, of whom 67 were brought up in contagious circumstances. It was found that, in children as in young animals, *BCG* vaccination is perfectly harmless, that it causes no obstacle to normal physiological development, and that it appears efficacious as an antituberculosis measure, since vaccinated children exposed constantly to tuberculous contagion always remain free from tuberculosis. The method first adopted in making and administering *BCG* has scarcely been altered. The vaccine consists of an emulsion of the attenuated tubercle bacilli in a binding fluid (synthetic medium of Stanton diluted to one-quarter) in such a manner that each dose (1 centigram) contains four hundred million living germs. It is administered in the first ten days following birth in three successive doses, and each dose is given forty-eight hours after the previous one. The preparation is given in a small spoonful of milk. This method of

administration was chosen because it has been shown that the intestines of a small mammal at the breast and also those of the young infant to about the fifteenth day after birth absorb with great facility microbes and even antitoxins. The vaccination of all infants is advocated and especially when the mother is tuberculous, for then the chances of contagion are so frequent that it is almost impossible to avoid them. We know from long experience how extremely serious these tuberculous infections of very young children usually are. From July 1, 1924, up to July 1, 1928, 96,000 children have been vaccinated in France with *BCG*, and the method has rapidly spread to many foreign countries. No one has reported pathological accidents attributed to the vaccination and everywhere satisfaction is expressed with the results. From French experience it would seem that the mortality from tuberculosis among the vaccinated is almost nil, while among the nonvaccinated brought up in tuberculous surroundings it is always great. Calmette is convinced that *BCG* can be used without the slightest fear of producing harm and that it should be employed everywhere where it is possible to obtain vaccinal emulsions freshly and properly prepared.—*On Preventive Vaccination of the New-Born against Tuberculosis by BCG, A. Calmette, Brit. J. Tuberc., October, 1928, xxii, 12.*—(*J. S. W.*)

Protective Inoculation with BCG.—Calmette's claims for *BCG* as a protective agent against tuberculosis have stimulated a great deal of work. He has laid down the following major contentions: (1) *BCG* is nontuberculogenic; (2) it can be transmitted from animal to animal without change in virulence; and (3) it does not lead to the establishment of allergy, yet protects against a subsequent development of tuberculosis. Experimentation with the strain *BCG* has failed to confirm these claims for (1) *BCG* is tuberculogenic; (2) it can be transmitted from animal to animal, although, if the strain is without virulence, one would not expect a change; and (3) *BCG* does produce allergy as can be readily demonstrated. *Harmlessness of BCG:* The more than 150,000 inoculations of *BCG* into children without demonstrable deaths is of itself attractive proof of the innocuousness of the virus, but such a result cannot be accepted, *a priori*, for the following reasons: (1) Some of these children have died of other causes and have not been autopsied, (2) tuberculosis has been found (proved) in inoculated children, and (3) Calmette has depended merely upon the reports of physicians, especially as to the cause of death, in unautopsied cases. As to the harmlessness of *BCG* in animals, all that Calmette claims is not proved. Further analysis of the claims reveals much that is not confirmatory. Results from protective vaccination in human beings can be adduced only by statistics. Long observation on large numbers of persons is necessary if one is to avoid or obviate erroneous conclusions, because of the character of the disease. The children inoculated by Calmette and his coworkers were largely of the volunteer and therefore highly intelligent type in whom one would expect a lower death-rate irrespective of the inoculation. In addition to this, French figures (mortality rates?) are usually regarded as being somewhat high. On the basis of statistical results, a certain favorable result from the application of Calmette's strain appears to be established, but from the standpoint of animal inoculation Calmette's own work is incomplete and inconclusive. Calmette claims to be able to produce specific protection without specific allergy. But his bacillus produces allergy to tuberculin which, in children, develops about the 20th day and lasts about 10 to 12 months. Reinoculation would then be necessary, but this is not a serious argument against *BCG*, since it is used principally in protecting infants during a given period of their lives. The results from the use of this product resemble closely those from the use of killed tubercle bacilli. What position shall German medicine take on the question of *BCG* inoculation? In the first place, it can be stated definitely that, in the face of 150,000 inoculations, the product is still on trial and in an experimental stage. Secondly, if *BCG* should actually fulfil the hopes expressed for it, if it should prove to be both innocuous and immunizing, then the question would still be asked whether the oral administration of the product is efficacious. At present we should feel our way along very cautiously as regards experimentation on children. The product should be used clinically only in very exactly defined situations and only after careful explanation to parents who should give their full consent. From the standpoint of general hygiene, it is important to consider whether mass vaccination is desirable at this time when the mortality rate from tuberculosis in both adults and children has been steadily declining and is continuing to do so. Science will gain more if careful attention be paid to *individuals* receiving the inoculation than to *mass* trials. Discussion of this subject follows at considerable length by Czerny, Pfeiffer, Neufeld, Pirquet, Moro, Selter and Degkwitz. These are in substantial agreement with the author.—*Ueber die Bedeutung der Calmetteschen Schutzimpfung gegen*

Tuberkulose. Eine Umfrage, Bessau, Czerny, Pfeiffer, Neufeld, Pirquet, Moro, Selter and Degkwitz, Deutsche med. Wchnschr., October 12, 19, 26, 1928, liv, 1707, 1759, 1803.—(*H. S. W.*)

Protective Inoculation with BCG.—This article is a reply to one previously written by Chiari, Noble and Sole of Vienna. *BCG* is an attenuated vaccine in sense of Pasteur, consisting of a strain of living tubercle bacilli of markedly attenuated virulence. The organisms, grown on artificial media and in the body, do not lose their fixed characters, and can act as antigen *in vivo* and *in vitro*, possessing the property of antibody-formation yet free from the possibility of producing virulent reinoculable tuberculous lesions in susceptible animals. The lesions produced by large doses of *BCG* (over 3 mgm. in guinea pigs) heal and disappear without leaving a trace behind. The *BCG* given *per os* to young suckling animals and children are intensively absorbed by the intestines so long as the intestinal epithelium is not yet fully formed. This absorption reveals itself as a subsequent micropolyadenitis. Sensitization to tuberculin only occurs exceptionally and in those cases in which the *BCG* produces lesions in the lymphatic system. These lesions heal. The extensive tests with *BCG* since 1921 indicate that the protective vaccination of newly born infants by the stomach route during the first ten days of life is harmless, and that it confers a resistance to virulent intradomiciliary infection during the entire term of childhood. The method should be utilized wherever the freshly prepared and well controlled vaccine from qualified laboratories can be obtained.—*Über die Schutzimpfung der Neugeborenen gegen Tuberkulose durch den BCG (Calmette-Guerin). (Erwiderung auf den vorstehenden Artikel fon H. Chiari, E. Nobel und A. Sole, Wien.) A. Calmette, Zeitschr. f. Tuberk., 1928, l, 38.*—(*H. J. C.*)

Protective Inoculation with BCG.—Nobel points out that the vaccine he used was viable and that the statistical methods used by Calmette are uncertain and unreliable.—*Schlussbemerkung auf die vorstehende Erwiderung von Prof. Calmette, E. Nobel, Zeitschr. f. Tuberk., 1928, l, 44.*—(*H. J. C.*)

Experiments on BCG.—Two cultures of *BCG* (one from the laboratory at Lille and the other directly from Calmette) were used in several experiments designed to test their pathogenic and prophylactic properties. One hundred and thirty-four guinea pigs in 15 experiments were inoculated with subcultures of these two original cultures, subcutaneously or intraperitoneally, in doses which ranged usually from 0.5 to 5.0 mgm. but which sometimes reached 20.0 mgm. Of these, 92 (68 per cent) failed to develop any visible evidence whatever of tuberculous infection, 30 (22.3 per cent) showed evidence of arrested or retrogressive tuberculous lesions, while 12 (9 per cent) developed extensive generalized tuberculosis. The average duration of life of six (of the nine) which died was 10 to 11 months. Thus the cultures possessed a low virulence and had a capacity to produce more or less marked disease in about 22 and serious disease in 9 per cent of infected animals. The virulence was "exalted by further serial guinea pig passage; and, as now carried from guinea pig to guinea pig, *BCG* strains . . . . cause typical tuberculosis and death." There is autopsy evidence that, in those animals which eventually survive the infection, the disease is more marked in the early months following inoculation than in later months. This would indicate a benign and spontaneously healing disease. But it is of the highest significance that the strain is not always innocuous. In one experiment of 20 guinea pigs, 11 showed no signs of tuberculosis at nine months (autopsy), but the remaining 9 animals showed lesions at longer than a year. The average duration of life in 94 guinea pigs without discernible lesion was 192 days, that of 32 guinea pigs with localized lesion was 290 days, and that of nine guinea pigs with typical tuberculosis was 309 days. Time is therefore a very important factor in such experiments. Suspensions of *BCG* cultures were inoculated into newborn calves, which had come from tuberculin-tested, tuberculosis-free herds. After inoculation, these calves together with non-vaccinated controls were fed with milk from tuberculous or suspected cows. All (17 of them) of the vaccinated and nonvaccinated calves showed tuberculous lesions at autopsy. It is a fact, however, that now Calmette requires the feeding of boiled milk for 30 days after inoculation before exposure to contaminated food is provided. This is a wise precaution and other experiments are under way on this basis. The only safe deduction from the experiments just mentioned is that *BCG* should certainly be considered as being in the experimental stage as regards its prophylactic properties and as open to question in so far as its innocuousness and efficacy is concerned.—*Researches on Bacillus-Calmette-Guerin and Experimental Vaccination Against Bovine Tuberculosis, E. A. Watson (in collaboration with C. W. McIntosh and H. Konst), J. Am. Vet. M. Ass., November, 1928, lxii (n.s. xxvi), 799.*—(*H. S. W.*)

Technic of Cultivation of BCG.—The author reviews in detail the various methods of importance in the culturing of *BCG*, the suitability of the media, the preparation and preserving of the suspension and the controlling of the avirulence of the vaccine. It is believed that a return to virulence of the culture is practically excluded. Extreme precaution is necessary to avoid contamination and especially the infection of test animals. All tests with *BCG* should be performed in laboratories suited to this purpose and having available satisfactory vessels and instruments for the purpose.—*Technik der Kulturen des BCG. Beschaffenheit des Nährbodens. Herstellung und Aufbewahrung der zum Schutzverfahren dienenden Emulsionen. Kontrollen hinsichtlich Unschädlichkeit bzw. Avirulenz des Schutzstoffes, A. Calmette, Zeitschr. f. Tuberk., 1928, l, 124.*—(*H. J. C.*)

Pathogenicity of BCG.—Kraus and Gerlach claim that the tuberculous alterations which may be produced by the *BCG* strain in experimental animals always recede and never produce a generalized or progressive disease. The author quotes from a paper by Gerlach to show that in a number of animals (guinea-pigs and goats) extensive and progressive lesions were produced. His own findings of progressive and lethal tuberculosis produced by *BCG* are reiterated. It is pointed out that, at the *BCG* conference of the Health Committee of the League of Nations, the final resolution does not definitely state that the *BCG* is harmless, but that it only takes cognizance of the evidence presented in favor of this view.—*Experimentelle Ergebnisse über den Impfstoff BCG nach Calmette, E. Nobel, Wien. klin. Wchnschr. November 22, 1928, xlvii, 1621.*—(*M. P.*)

Pathogenicity of BCG.—In answer to Nobel's criticism, it is stated that the amounts of *BCG* used for immunization and in its usual application are definitely harmless, and that the experiments on cattle in Austria fully support this claim.—*Bemerkungen zu den Ergebnissen der experimentellen Prüfung des Impfstoffes BCG nach Calmette-Guérin, F. Gerlach, Wien. klin. Wchnschr., November 22, 1928, xlvii, 1622.*—(*M. P.*)

BCG not Virus Fixé.—Kraus designated the *BCG* strain as a *virus fixé*. Comparing the properties of this strain with Pasteur's *virus fixé* of lyssa, it is obvious that this designation is incorrect. The two vaccines have only one property in common, that is, that they are different from the original strain and that they do not revert to the original strain. In all other properties they are fundamentally different. *BCG* is avirulent. A *virus fixé* is virulent and may be highly virulent in certain modes of application. *BCG* is pathogenic in its mode of application, the *virus fixé* is not. *BCG* does not act when it is killed, while a *virus fixé* in the killed condition produces immunity. The *BCG* strain can apparently not be increased in its virulence, while a *virus fixé* can be increased in its virulence. The incubation period of a *virus fixé* is constant and independent of the dosage which is not the case with *BCG.*—*Ist der Stamm BCG ein Virus fixé?, F. Schweinburg, Wien. klin. Wchnschr., February 7, 1929, vi, 164.*—(*M. P.*)

Observations on BCG.—Heat-killed tubercle bacilli should be given an extensive trial in exposed children. Guinea-pigs inoculated with 7 to 20 mgm. of *BCG* intraperitoneally showed tuberculous changes at autopsy after three to four weeks, but after three months no macroscopic process remained, even though histological changes might be considered as still present. *BCG* therefore possesses a certain virulence, but the changes produced tend to localize and retrogress. *BCG* is a weakened virus vaccine in the sense of Pasteur. It is to be regretted that the number of autopsy findings in cases of intercurrent deaths has been small, so that little information is at hand as to stomachally introduced tubercle bacilli. The Calmette procedure should be efficiently tested by qualified workers before it is used generally. If it proves protective in infants, its extended use in children and adults should be considered.—*Ziele und Wege der Immunitätsforschung zur Bekampung der Tuberkulose, R. Kraus, Beitr. z. Klin. d. Tuberk., 1928, lxviii, 686.*—(*H. J. C.*)

Report of Conference on BCG.—A conference of hygienists and physicians met in Paris to consider Calmette's claims of immunization against tuberculosis by inoculation with *BCG*. In the conference Calmette spoke freely both privately and before the assembly. He was very earnest but was theoretical and appeared to be rather a dreamer who accepts loose statements and irregular data somewhat uncritically. The data on which much of the claims is based are certainly open to criticism. One citation suffices as an example: One doctor (in Spain) administered *BCG* to 358 of 880 inmates of a foundling hospital. Of these 358 infants, 158, or 44 per cent, died from all causes, while of the untreated infants 33 per cent died, and of the entire 880, 36 per cent died. Of the treated children which died, only 1.1

per cent died of tuberculosis, while of those untreated which died 3.8 per cent died of the disease. Such data are not altogether convincing. It appeared in the discussions at the conference that *BCG* is innocuous and that it probably does confer some degree of immunization. But it should not excite too great hopes for clinical application, despite the reports from the veterinarians.—*Die Sachnerstaendigenkonferenz der Hygiensekion des Voelkenbundes betreffend die Calmettesche Tuberkulose-Schutzimpfung* (*Paris 15–18, x*), *Schlossmann, Deutsche med. Wchnschr., November 9, 1928, liv, 1871.*—(*H. S. W.*)

Survival of Human Tubercle Bacilli and BCG in Cattle.—Heymans and Millie, in 1905, commenced general tuberculin-testing of all cattle at a large agricultural experimental station, comprising 300 animals on three distinct farms several kilometres apart. On the smallest, including 60 to 70 head, all reactors were immediately eliminated and eventually replaced by healthy animals from the other farms, so that after the third test this stable contained 68 nonreactors. On March 28, 1907, a sac containing 0.1 cc. of a 1 per cent suspension of human tubercle bacilli in glycerine-broth, or about 1 mgm. of bacilli dried on filter paper, was placed hypodermically behind the right shoulder of each of these 68 animals. Twenty-eight of these animals were later killed for purposes of domestic economy. Each year these were retested with tuberculin, and those slaughtered were subjected to careful necropsy. The sacs containing the living human bacilli are provisorily impermeable, become encysted, and in a few days give rise to a small tumor. But after two or three weeks the bacilli pass through the wall, which becomes corroded and infiltrated by cells, so that even leucocytes pass into the interior. The annual tuberculin testing was done with 5 cc. of tuberculin diluted 1–10 and given subcutaneously. Rectal temperatures were taken after 12, 15 and 18 hours. In 1913 and 1914 the conjunctival test was also introduced, using 4 to 6 drops of crude tuberculin, with readings after a two-hour interval. None of the 40 animals gave a positive reaction to subcutaneous tuberculin during 1907 to 1912 inclusive. On May 14, 1913, a reinjection of tuberculin was given to the 8 remaining animals, of whom one responded with a typical thermal elevation but showed no lesion at necropsy except the vaccinal tumor. The eye test was done on 6 and was also negative. On the other hand, on May 14, 1914, the test was clearly positive in 6 animals. These were again subjected to the subcutaneous tuberculin test, one being found positive, two suspicious, and three negative. Of the original 40 animals 18 were very carefully necropsied at Gand; only 4 of them had been exposed to tuberculous animals for one to two years on other farms. Two of these latter animals showed minimal tuberculosis. The original small vaccinal tumor was discovered in 16 and examined. In all cases it represented small tuberculous abscesses containing bacilli, which stained perfectly and which Vercouillie, who is very experienced in the differential microscopic diagnosis of types of tubercle bacilli, unhesitatingly pronounced to be human bacilli. Thus, the human bacillus, injected into cattle, remains human for at least seven years. Virulence was tested by guinea-pig and rabbit inoculation. In certain cases the rabbits, reinoculated with suspensions of the lumbar lymph nodes of guinea pigs, died as rapidly as is customary after bovine-bacillus inoculation. The question of augmentation of virulence of human bacilli by prolonged bovine residence prompted further studies on the 6 subjects remaining after the 1914 tuberculin tests; but these were interrupted by the war after one necropsy of an animal with a positive ocular reaction and a doubtful subcutaneous one had revealed no lesion aside from the vaccinal tumor. *Summary: 1:* Cattle may be carriers of living virulent human bacilli six or seven years without reacting to tuberculin. May not the same thing occur in cattle exposed to human bacilliferous sputum and *vice versa*, without a positive tuberculin reaction? *2:* Such cattle, carriers of human vaccinal tubercle, not only fail to react to tuberculin but are not in the true sense infected. Replacement of living by killed human bacilli enclosed in a sac results in some, although less, immunity. *3:* The 6 cattle, carriers of human bacilli and not reacting to tuberculin for six years and a half, after seven years showed a positive oculoreaction and a partial thermic reaction (subcutaneous injection), yet one showed no necropsy lesion; hence it seems that some degree of allergy may be induced by incarcerated human bacilli in cattle. It seems that their virulence becomes greater than that of ordinary laboratory cultures and may approach that of bovine bacilli. May not bovine bacilli undergo similar changes and induce human phthisis? *Experiments with Calmette's BCG:* One calf was vaccinated with *BCG* a few weeks after birth in February, 1925, and this was repeated a year later. In November, 1925, the oculoreaction was negative but twice during 1926 it was positive. The animal died of an intercurrent infection in October, 1926, and

necropsy showed tuberculous abscesses of the bronchial and mediastinal lymph nodes, containing virulent bacilli for the guinea pig. Two vaccinal tumors were also found, containing acid-fast bacilli which failed to tuberculize 6 guinea pigs. The question arises whether any of these bacilli, rendered avirulent, can acquire virulence, like human bacilli, by residence in the bodies of cattle.—*La survie du bacille de la tuberculose humaine et du BCG dans le corps des bovidés, J. F. Heymans, Rev. Belge d. l. Tuberc., July-August, 1928, xix, 151.*—(*A. P.*)

Disinfection of Dwellings of Tuberculous.—On June 30, 1927, the French Chamber of Deputies voted for a law whose principal provisions are as follows: *1:* Cases of open tuberculosis, after every death or change of lodging, shall be reported to the public health authorities by their physicians. *2:* Disinfection of abodes and personal objects is obligatory for all cases of infectious (open) tuberculosis, after such death or change of lodging. A certificate of a pharmacist or of a laboratory will attest to its execution and will be addressed to the health service within eight days. This service will itself take action only in case of resistance, negligence or indigence on the part of the household. The medical press has abstained from comment, although it seems that the reasons for or against such legislation should be thoroughly aired. The matter of obligatory declaration of cases of the disease is, of course, only one of good sense, since in order to protect the public against a disease the authorities must know where and how widely it exists. The part of the law relating to domiciliary prophylaxis, however, is open to discussion. *Historical Review of Disinfection:* Following the researches of Villemin and Koch the conception was held that human tuberculosis was largely transmissible through bacillary dust from desiccated tuberculous sputum, fortified by Cornet's famous experiments in tuberculizing guinea pigs by the energetic brushing of a carpet on which tuberculous sputum had been allowed to dry. The determination of the long survival of bacilli in sputum, together with the excessive and persistent mortality among the occupants of certain dwellings, seemed to prove the logic of this doctrine irrefutably. Consequently the necessity of disinfecting the dwellings of the tuberculous was imposed as an attempt to destroy the bacilli at their source of emission. Disinfection was urged by Villemin in 1889, again in 1898–1900 by Grancher, and in 1906 by Landouzy. However, as the practical difficulties of frequently repeated disinfection arose, Vallin, in 1889, proposed the disinfection of the domiciles of the tuberculous only after death, and other compromises were sponsored by Gilbert, Laveran, Grancher and Chauffard. In 1909 a permanent Commission on Tuberculosis of the *Académie* took up the subject and recommended that disinfection be obligatory only after death, a view adopted by Letulle, Robin, Küss and others, and proclaimed at the International Congress at Rome. During the succeeding fifteen years our ideas on the matter of tuberculosis aetiology and prophylaxis have been revised and the notion of indirect contagion has lost ground. Numerous observations have shown that tubercle bacilli in the sputum hardly ever last three months, despite protection from light and desiccation. Only children are likely to put their hands on the floor and walls. Also, to infect individuals without difficulty, the tubercle bacillus, after desiccation and pulverization, must be suspended in the atmosphere inhaled, but in this state it is susceptible to the action of light and its vitality is soon destroyed. On the other hand, Flügge showed that the tubercle bacilli in liquid droplets projected by certain coughing consumptives on objects in the vicinity retain their virulence not more than four to six days, due to exposure to the light and air. From the foregoing facts it appears logical to conclude that, under ordinary circumstances, a very small fraction of the tubercle bacilli disseminated in dwellings are capable of aerial transmission sufficiently to seriously endanger human beings. It is now known that the really serious tuberculous infections result from massive or frequently repeated doses of normally virulent bacilli. Also, to set up a progressive tuberculosis, they must encounter persons free from previous infection, such as young children. Once early childhood is past, such grave infections become rarer, and benign, usually occult, infection more common. Minimal, paucibacillary contaminations, to use Bernard's term, as in the case of aerial suspensions, are too dispersed and diluted to be very dangerous. Those adults who become tuberculous do so not from fresh contagion, with rare exceptions, but from a reactivation of foci which have remained latent or dormant since childhood or adolescence. Such a conception relegates infection from contaminated dwellings to a very minor place. Furthermore, procedures really capable of destroying all the tubercle bacilli deposited in dwellings involve practical complications. Roux, Director of the Pasteur Institute, in 1912 declared that most of the dried bacilli become innocuous in less than two weeks and that disinfection of dwellings can scarcely be expected to exert

much effect in diminishing tuberculosis mortality. It is evident that to prevent massive bacillary dissemination the essential thing is to intervene, as soon as possible after the appearance of open tuberculosis, between the carrier and the infectable persons in his entourage, and that certain personal objects used by him must also be taken care of. Disinfection when applied directly to bacilliferous sputum, carefully collected, is fully justified and effective. But as regards places, the simple processes of cleaning suffice for all practical needs. This simple modern domiciliary prophylaxis has been rendered effective thanks to the activities of dispensaries and visiting nurses. Moreover, the efficacy of the common methods of disinfection is disputed. Vallen, in 1906, convinced that formaldehyde vapor would not certainly kill the tubercle bacilli in the dust of dwellings, or in dried sputum on walls and floors, assured the *Académie* that simple washing with warm water containing corrosive sublimate or Javelle water could be considered sufficient, while Daremberg declared that in place of chemical agents one should rely on continuous aeration, accompanied by thorough scrubbing and exposure to sunlight if possible. Kerstein, in a report to the German Central Committee, stated that even by vaporizing a given amount of formol solution per area the effects were uncertain and that mechanical measures, such as soap, water and scrubbing-brush, were more effective. Roux, in 1912, called attention to the difficulties and inconveniences involved in the disinfection of domiciles and the attending undesirable publicity. American physicians have proved particularly competent and experienced regarding tuberculosis prophylaxis and they attach very little importance to disinfection of habitations. Gunn, of Boston, has referred to formalin disinfection as a fetich, while Vincent has also criticized it as ineffective. The recommendations of the American Public Health Association, worked out by Chapin, Park, Flexner, and Smith, and signed by other eminent authorities, do not include domiciliary disinfection, while the Prussian regulations apply only to such personal objects as beds, mattresses, clothing and linen. The Americans recommend cleaning with brush, soap and warm water, and carbonate of soda. Unhappily, French politicians have not heeded any of the foregoing authorities, and to complete the inaninity of the procedure have specified no particulars other than formaldehyde vaporization. The text of the law evolved mysteriously by the Commission of Health leaves the details of the procedure to the competence of the pharmacist or disinfecting laboratory, so that instead of a thorough cleaning we may have a sacramental vaporization of formalin! No public hearing was given on the matter. Thus we are to have in France a pitiful routine of formalin disinfection which will probably be only exceptionally carried out, prescribed and supervised by incompetent persons, while most physicians remain indifferent or bound by tradition, while Germany and the United States, under the influence of progressive scientific knowledge, have replaced this almost useless measure with practical precautions of cleanliness and supervision.—*La désinfection du logement des tuberculeux, E. Arnould, Rev. Belge d. l. Tuberc., July-August, 1928, xix, 159.*—(*A. P.*)

Prognosis in Pulmonary Tuberculosis.—The German classification of pulmonary tuberculosis is based essentially on the extent of the lesion (Turban). This classification implied the belief that the second and third stages develop from the first stage, which latter comprises chiefly localized apical lesions. Later studies emphasized the importance of a qualitative diagnosis. The French school differentiates chiefly between the period of primary infection and the period of reinfection. Based on the studies of Bard-Pierry, many different types of diseases were formulated in whose differentiation the prognostic point of view was predominant. The practical results are that in Germany the majority of all sanatorium patients were those with apical tuberculosis, while in France these forms had been recognized as abortive disease, and the sanatorium received chiefly destructive and bacilliferous lesions. It is fully acknowledged now in German teaching that the Turban classification is prognostically insignificant. It is recognized, too, that exudative types cannot be identified with malignant types, nor the productive-cirrhotic types with benign ones. The disease in the same patient frequently varies from benign to malignant conditions. The latter are chiefly those which show caseation and liquefaction. A correct prognosis cannot depend on the question of whether a lesion is exudative or not, but must decide whether this lesion is destructive or not. The course of tuberculosis is almost never continuous, but it occurs in exacerbations. The diagnosis of such exacerbations is most important. Every new focus and every exacerbation represent an exudative phase. This dictum is well substantiated by pathologicoanatomical studies. The roentgenologically demonstrable infiltration is composed of the central focus and perifocal inflammation. The exudate may be re-

sorbed or may terminate in induration. An acute infiltration usually simulates a larger lesion than the one actually existing. A prognosis can only be pronounced for each existing exacerbation, and not for the whole course of the disease. The primary infiltrations in children are frequently mistaken for caseous pneumonias, and their prognosis as a rule is better than what one would expect. In infants only 30 to 40 per cent of lobar infiltrations go on to excavation. This percentage decreases with increasing age. If cavitation occurs, however, the prognosis is very poor. Secondary infiltrations are formed around older foci. They are very frequent in childhood, and they are found particularly near the hilum. Only a very small percentage of these perihilar infiltrations excavate, and as a rule their prognosis is favorable although they have a marked tendency to recurrence. In both primary and secondary infiltrations the prognosis depends very much on the question of whether repeated superinfections can be prevented or not. Haematogenous propagations, which are frequently seen in children following the primary infection, are usually given a graver prognosis than they deserve, while their scarified residues are frequently underrated in importance. As long as the occult bronchial lymph-node focus exists, repeated propagations may occur whose severity cannot be predicted. The haematogenous foci, which localize in the apical fields, show less tendency toward healing than in other areas. It is frequently observed that lower foci will completely resorb, while apical foci remain visible for the rest of life. This is the reason why apical scars as residua of haematogenous propagations in childhood are so frequently found in adult life. But these scars should not be diagnosed as incipient foci. The beginning of pulmonary tuberculosis in adult life is always marked by the appearance of acute infiltrations. It does not matter whether they occur in the apices or in lower portions. Apical foci should be differentiated into acute infiltrative and chronic indurated ones just the same as foci in other parts of the lung. One finds in the apical fields early infiltrations, primary foci, isolated haematogenous metastases from childhood, and indurated foci as a result of secondary infiltrations, and pleuritic-atelectatic scars. Whether these scars are important in phthisiogenesis is undecided. In other words, it is not known whether the early infiltration is an endogenous metastasis from an apical scar, or is due to an exogenous superinfection. Since, according to pathological findings, 90 per cent of all adults show apical scars, it is impossible for practical work to consider all bearers of apical scars as prospective consumptives. Regardless of pathogenesis it must be stated again that the early infiltration is the clinically demonstrable beginning of progressive pulmonary tuberculosis in adults. The roentgenological appearance of the early infiltration is well established by recent work. The clinical signs are frequently deceiving. Approximately 60 per cent of these lesions excavate if not treated. Under proper rest, and pneumothorax treatment if indicated, the prognosis is much better. But a sufficiently early diagnosis is only rarely made. The patients come under medical supervision only when the second or third exacerbation occurs. Cavities are then present in a large number of patients, and medical action is chiefly concerned with the indication and possibilities of collapse therapy. Even in cases of an indurated early infiltration, the prognosis should be guarded, since recurrences occur not infrequently. The single exacerbation has usually a fair prognosis, but the successive exacerbations which occur render the total prognosis less favorable.—*Klinische Gesichtspunkte zur Prognosestellung bei der Lungentuberkulose, F. Redeker, Klin. Wchnschr., January 29, 1929, v, 193.*—(*M. P.*)

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